

November, 1960

ROADS^{AND} STREETS

A GILLETTE PUBLICATION



UNIVERSITY MICROFILMS
EUGENE B. POWER R6
313 N. 1ST ST.
ANN ARBOR, MICH.
COMP-LRV-11-50

Important NEW features of the

JACKSON

AMERICA'S MOST POPULAR
MULTIPLE-SHOE
VIBRATORY COMPACTOR



Changing from the 13 ft., 3 inch working width to 88 inches overall for road travel or maneuverability on the job is accomplished hydraulically in just 30 SECONDS.



The new widening attachment (optional at added cost) is raised or lowered instantly. Makes the JACKSON by far the most efficient compactor for widening projects.

... for more details circle 305 on enclosed return postal card

1. The 2 outer compactor units at each side of the workhead can be hydraulically raised to a vertical position for road travel or maneuverability around other equipment in just 30 SECONDS. Compare this with the time consuming job required on other equipment.

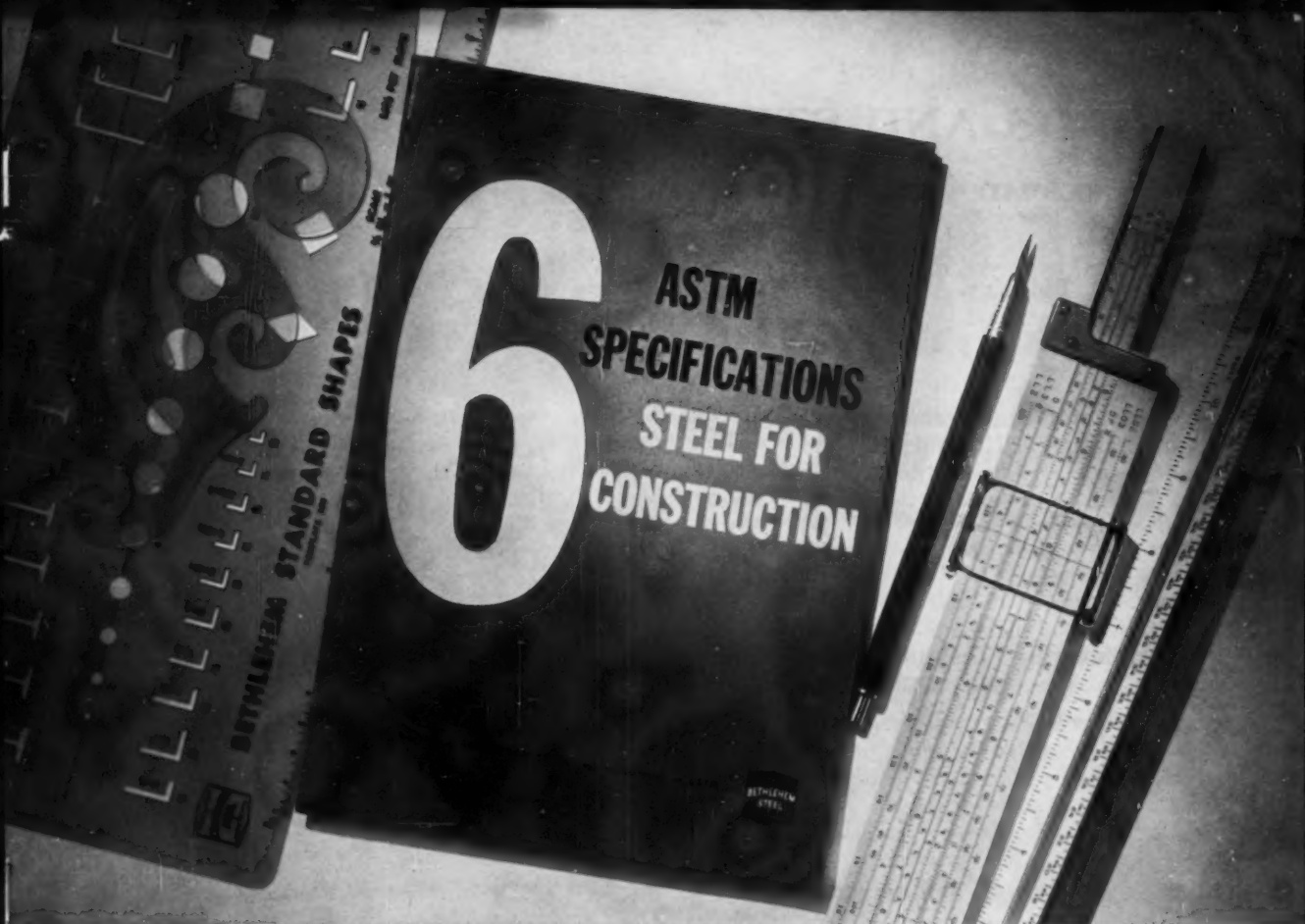
2. The new widening attachment can be instantly lifted or lowered when entering or leaving the area to be compacted.

With these added features there is nothing in its category that matches the JACKSON. 4200 3-TON BLOWS PER MINUTE from each of the compactor units provide extremely high productivity. 100% of specified density is frequently attained in one pass. And the Jackson does not leave the top 1-inch of the lift in a loose condition . . . a very important consideration. It operates in either direction . . . no turning or deadheading required. It reduces downtime to a minimum. Maintenance and economy of operation are exceptionally low.

For the best, lowest-cost compacting investigate the JACKSON MULTIPLE COMPACTOR. For sale or rent at your Jackson distributor. Name and further details on request.

JACKSON VIBRATORS, INC.

LUDINGTON, MICHIGAN



Now in a handy new booklet . . .
the latest ASTM Specifications for the six grades
of structural steel that meet 98%
of all usual construction requirements



for Strength
 . . . Economy
 . . . Versatility

Whether you design or build bridges or buildings, you're sure to find this new booklet of real value.

It contains, both in capsule form and in more detail, the latest structural steel specifications. Here are the differences between, and the specific advantages of, the new ASTM specifications A36, A440, and A441. Here is the information that can help you quickly select the best and most economical grade of structural steel for the job.

If you'll fill in and mail the coupon, we'll see that you get your copy of "Six ASTM Specifications" promptly.

BETHLEHEM STEEL COMPANY, Bethlehem, Pa.
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FRONT COVER SCENE

Cleveland trencher seen at work for 10 miles of drain tile, installed in shoulders of an Ohio Interstate project to help correct adverse soil conditions.



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GOODYEAR

UP FOR A BIG BID?

Let Goodyear keep
your tire costs down

FINDING THE WORK FACTORS—Goodyear Big-Tire Specialists are prepared to analyze your tire needs with an eye to keeping costs under control. These specialists will check the terrain, loads, climate, roads, schedules and speed problems that confront you, and can select the right Goodyear tires to help you solve them.

PUTTING BIG-TIRE KNOW-HOW TO WORK—From the world's greatest wealth of experience, Goodyear Big-Tire Specialists are uniquely qualified to help you. And they'll provide the best in tread and body designs to help safeguard your contract and your profits.

SETTING UP BIG-TIRE SERVICE—You say the word, and Goodyear Big-Tire Specialists will set up a tire-maintenance program at the job-site to help save you man-hours, machine-hours and useful tire life. In addition, Goodyear Contractor Service *will travel* with your job—handle all your tire maintenance and repair needs.

With BIG-TIRE PERFORMANCE
Example: SUPER HARD ROCK LUG

Here's one of Goodyear's Big Tires for the Big Bid you have coming up. It's the SUPER HARD ROCK LUG, built for heavy loads and no roads to make the going easy. Triple-tough 3-T Nylon Cord for the greatest tire stamina, plus new, special cut-shrugging rubber compounds, make this tire a real cost-saver in the roughest off-highway service.

For details on this and other Goodyear special-duty tires, and the Goodyear Contractor Service, see your Goodyear dealer. Or write Goodyear, Truck Tire Dept., Akron 16, Ohio.

Lots of good things come from

GOODYEAR

MORE TONS ARE HAULED ON GOODYEAR TRUCK TIRES THAN ON ANY OTHER KIND

ROADS AND STREETS, November, 1960

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OWEN BUCKETS

ALL
THEM
THE
GIANT
OF
THEM
ALL



The following five combined features make OWEN the big giant performer . . . for any type of clamshell work . . . for any model or make of crane.

1. Block and Tackle Type Reeving
2. One-Piece Head Construction
3. Riveted Bowl Assembly
4. Single Main Shaft
5. Recessed Lips

Added to these construction features are more than fifty years experience in the manufacturing of clamshells . . . and nothing else! For any job that requires a clamshell, there is an Owen to fill the bill . . . backed by proven construction design and over one-half century of experience.



Put the Giant on your crane — OWEN — and know the work will be done faster, better and more economically.

Write today for any specific
or additional information

The OWEN BUCKET Co.

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BRANCHES: New York • Philadelphia • Chicago
Berkeley, Calif. • Fort Lauderdale, Fla.



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ROADS AND STREETS

Devoted to the design, construction, maintenance and operation of highways, streets, bridges, bridge foundations and grade separations; the construction and maintenance of airports. Represents 68 years of continuous publishing in the highway field; combined with Engineering and Contracting and Good Roads Magazines, established in 1892.

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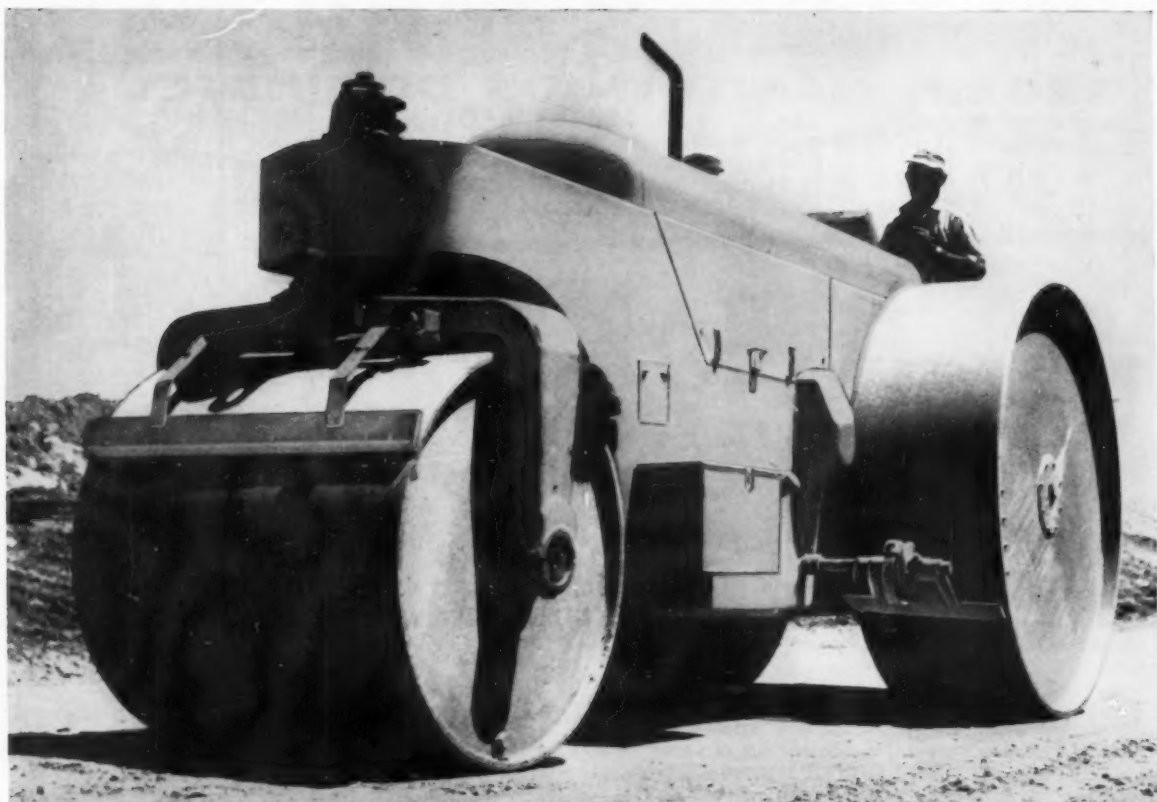
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OTHER GILLETTE PUBLICATIONS

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New enamels made with M50 pigment give equipment better...longer protection...control under-the-film rusting.

New! One-coat equipment enamels with built-in rust inhibition...

keep on fighting rust even when damaged in service

Now, for the first time, you can have the rust inhibition of a primer and the durability of a finish coat, combined in a single coat of enamel.

And what is more, the paint can be tinted to match most standard equipment colors.

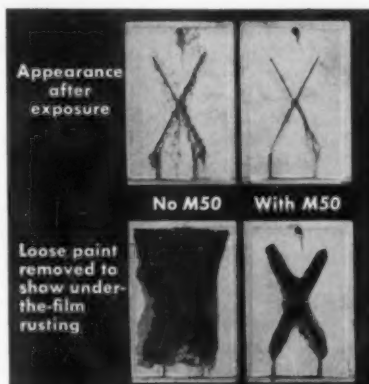
What gives these new one-coat enamels their exceptional properties is a unique new type of pigment, M50® basic lead silico chromate. In this pigment, the active ingredient is basic lead chromate solidly fused to an inert core. Fused lead chromate has not only exceptional rust inhibiting action, but also superior resistance to weathering.

Greatly inhibits under-the-film rust creepage, too

As you've probably noticed, when ordinary enamels are nicked or damaged in service the rust that starts spreads under the paint in no time. As this rust creepage progresses, paint flakes off to open the way for further corrosion.

Exposure tests (see photograph at right) at National Lead Laboratories show that this damage is very sharply reduced when M50 pigment is in the enamel.

Before you order paint again... look into these unusual new enamels. They can be made up by your regular paint suppliers in nearly all standard equipment colors.



How tests were made—Test enamels were applied over clean, cold-rolled auto body steel, scored, and then exposed to 5% salt fog for 300 hours. The two panels at top permit you to compare appearance of enamels after exposure. The two panels at bottom have loose paint removed so that you can compare the true extent of rust creepage under each enamel. Note also, the greater film strength shown by the M50 enamel.

M50®
an **oncor**® Pigment... A Development of

National Lead Company
General Offices: 111 Broadway, New York 6, N.Y.

ANOTHER BIG JOB AGAIN MANITOWOCS DOMINATE!



Two of the Hardaway Contracting Co. Model 3900 cranes at the Kentucky lock and dam site.

In Louisville, Ky. work has been progressing for over two years on reconstruction of Lock No. 41, just one phase of a billion dollar, long range Ohio River navigation and improvement program. Initial efforts on the complicated, \$19,300,000 Louisville job include the construction of four huge cofferdams.

General contractor is the Hardaway Contracting Co., Columbus, Ga. under supervision of the Louisville District, U. S. Corps. of Engineers. The Hardaway Company has been using two Manitowoc Model 3900 cranes exclusively for the cofferdam construction, handling 13 ton templates and the 60 ft. steel sheet piling to form the coffer cells. The cranes also have been placing concrete for both guard and lock walls. An estimated 375,000 yds. of concrete will have been placed before the job is completed.

On another phase of the Louisville project, Traylor Bros., Inc., Evansville, Ind. has been using a Manitowoc Model 4500 Vicon dragline, equipped with a 147 ft. boom and a 5 yd. bucket, for widening and deepening a mile and a half of the upstream approach channel. The drag moves approximately 375 yds. of mud and rock per hour, widening the channel from 200 to 500 ft. An estimated 3,500,000 yds. of earth and 200,000 yds. of rock will have been removed when the job is finished in late winter of 1961.



Manitowoc 4500 Vicon dragline dredges 375 yds. of mud and rock per hour.

Commenting on the performance of the Vicon dragline, Mr. Ford Dyer, Project Manager for Traylor Bros., Inc., said, "We find that the Manitowoc maneuvers better than any other machine of comparable size and that it works 10 to 12 per cent faster." In addition to the dragline, Traylor Brothers have used two Model 3900 Manitowoc cranes at the job site.

On multi-million dollar jobs like this or everyday "bread and butter" jobs, Manitowocs are consistently the choice of contractors needing big output at the lowest possible cost. Be sure to call your Manitowoc distributor when you are ready to improve your equipment fleet.

9-C

Manitowoc

MANITOWOC ENGINEERING CORP.

(A subsidiary of The Manitowoc Company, Inc.)
Manitowoc, Wisconsin

SHOVELS
1½ to 6 YDS.

CRANES
25 to 125 TONS

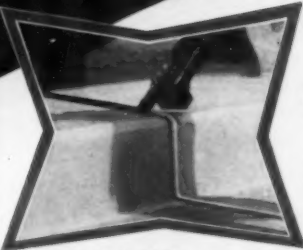
DRAGLINES
1½ to 7 YDS.

TRENCH HOES
1½ to 3 YDS.

For more details circle 313 on enclosed return postal card

BRIDGE SEALING PROBLEMS? SOLVED! with ALLIED JET SEAL and

NEW COMPACT ALLIED-STROUD APPLICATOR



Allied JET SEAL is the Original two-component, polysulfide, polymer-type, joint sealing compound. The Allied-Stroud Applicators (Models X691-E and 8591-D) are manufactured by Allied-Stroud Corp., a division of Allied Materials Corp. This is the only equipment authorized for the application of Allied JET SEAL (Products 9015H and 9015M).

For complete information about Allied JET SEAL and the Allied-Stroud Applicators, write to:

IDEAL FOR CURB JOINTS—TIGHT SPOTS

With the COMPACT Applicator, curb joints (above), wing-walls—any tedious sealing problem—is solved. Extreme mobility, light weight, small size save time and manpower on all bridge sealing jobs.

COMPACT APPLICATOR FEATURES:

- Light weight: 650 lbs. 22 inches wide, 48 inches long. Will turn in the space of its own length. May be transported in a pick-up truck.
- Ideal for sealing vertical and overhead joints—light enough to be hoisted. Can apply 100 lbs. of JET SEAL per hour.
- Incorporates features of large JET SEAL Applicator (MODEL 8591-D).

JET SEAL (9015H) FEATURES:

- Material has no flow—even at elevated temperatures (200°F). Ideal for sealing vertical and overhead joints.
- Has positive adhesion, cohesion, resilience and ductility at low temperatures (-20°F).
- Will prevent penetration of water into joints. Is highly resistant to highway salts.
- Will prevent incorporation of incompressible materials. Quick curing at all temperatures.

ALLIED

MATERIALS CORP.

PRODUCERS, REFINERS
AND COMPOUNDERS OF
SPECIAL ASPHALT PRODUCTS

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PLANTS: STROUD, OKLA. • DETROIT, MICH. • LOS ANGELES, CALIF.

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TURN TO FULL-POWER STEERING

Only Allis-Chalmers all-hydraulic motor scrapers give you full-power steering... give you more steering power at full 90-degree position than others can muster straight ahead!

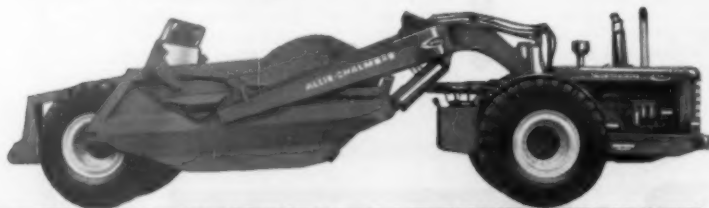
Here's why! Every Allis-Chalmers motor scraper has:

- ... An independent hydraulic system *just for steering*
- ... *Double-acting steering jacks*
- ... Positive leverage "never-over-center" linkage design

These three advantages enable every Allis-Chalmers motor scraper to *recover faster from full 90-degree turns than any other motor scraper*. In addition, *two-stage steering* control provides fast, non-stop turns with only a 1/6 turn of the steering wheel. A slight turn of the wheel gives you responsive steering for steady, accurate handling at high haul road speeds.

For everything you want in big-production motor scrapers, turn to *full-power steering—double-acting bowl jacks—highest apron lift and forced ejection—KON-TORK differential*... good reasons why you can tackle any size job and be confident of top-notch production. When you put any Allis-Chalmers motor scraper in your spread—from 155 to 340 hp... 10 to 30 yd—you'll see the difference *on the fill*. Allis-Chalmers, Construction Machinery Division, Milwaukee 1, Wisconsin.

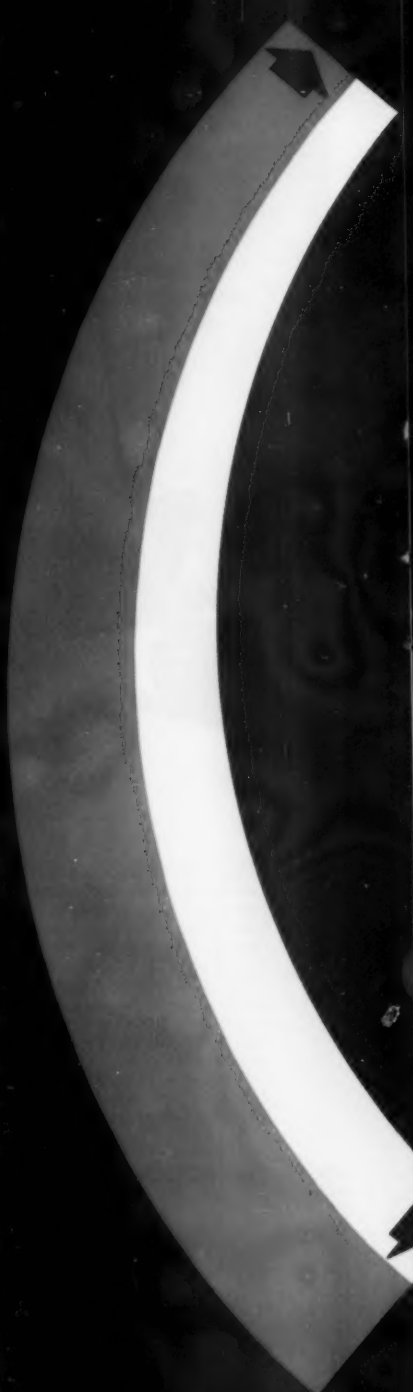
KON-TORK is an Allis-Chalmers trademark.



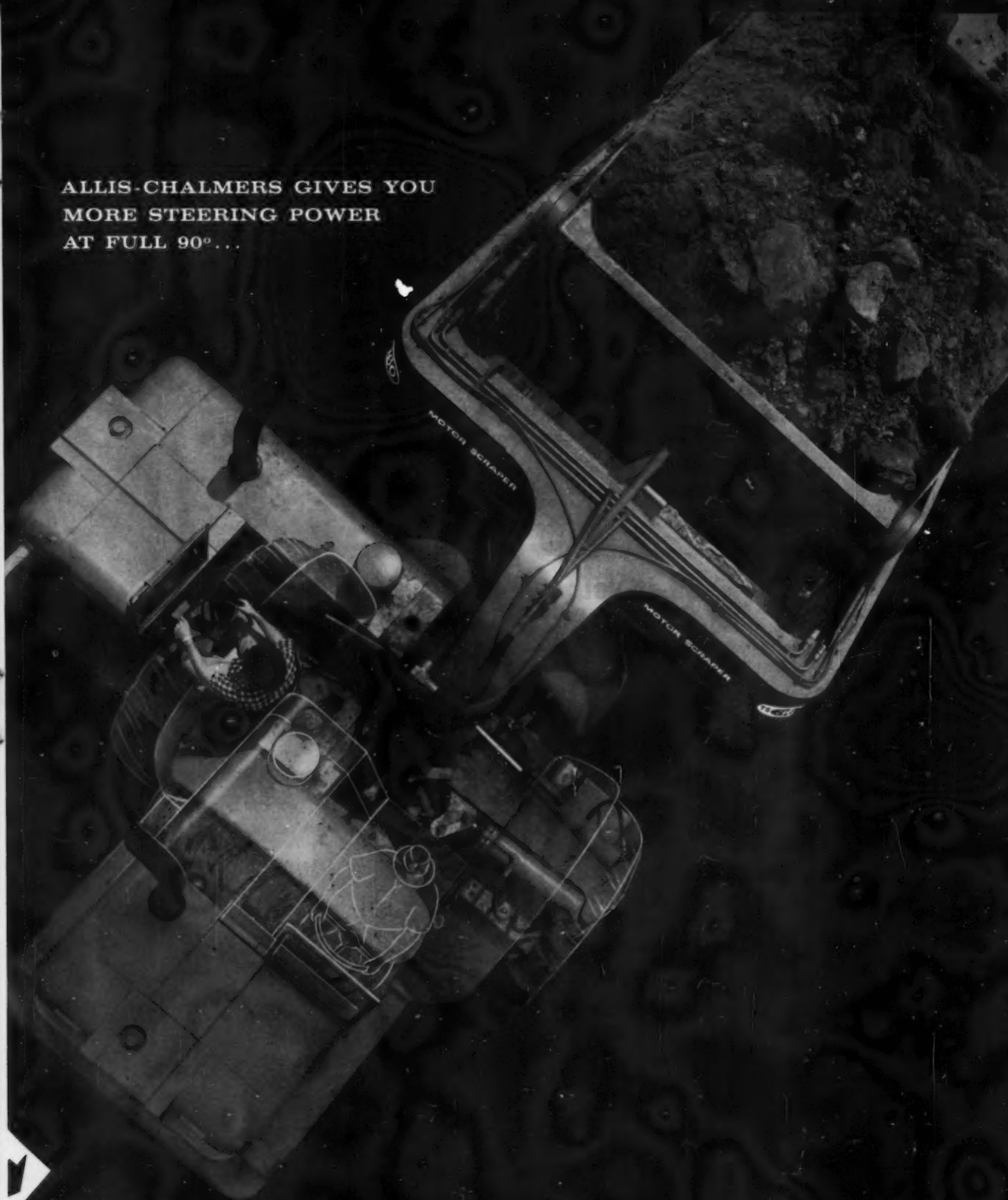
move ahead with

ALLIS-CHALMERS

... power for a growing world



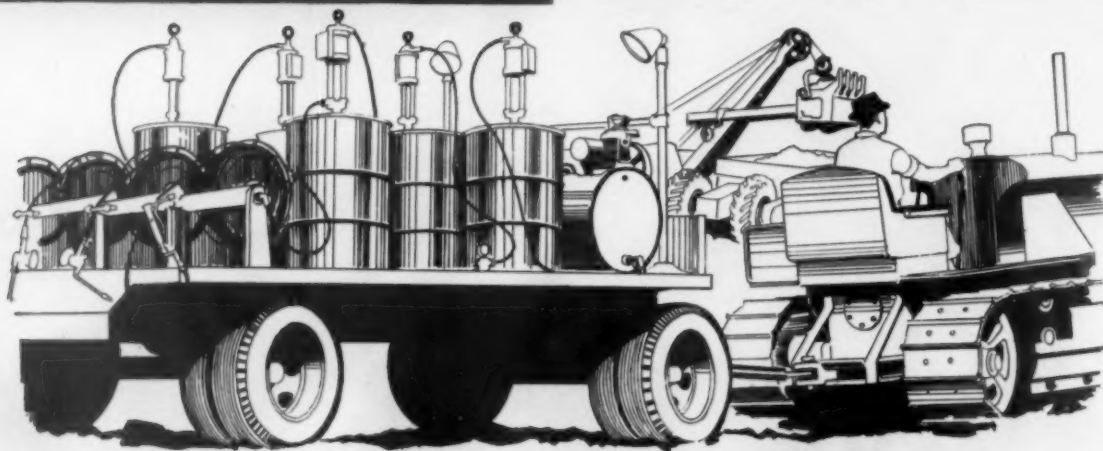
ALLIS-CHALMERS GIVES YOU
MORE STEERING POWER
AT FULL 90°...



...THAN OTHERS DO STRAIGHT AHEAD

LUBE LOGIC

Tips for more



Do-it-yourself lube rig trailer

Maybe you're aware of all the advantages of a mobile lube rig, but just don't want to tie up a truck for this purpose. Or, perhaps you'd like a supplementary rig. You can solve either problem neatly by mounting your field lubricating equipment on a standard 5-ton farm trailer. That way, you can take your whole simplified lube plan out into the field where it's needed, without costly deadheading back to a fixed service point—and you can move the lube rig just by hitching

it to any truck, so it's just as mobile as a truck mounted rig at much less cost. And here's a bonus: by hitching your lube rig trailer to a bulldozer, you can take field service to spots that wouldn't be accessible to a regular truck.

Trailers for this purpose, as well as tanks and pumps, are all standard items you assemble yourself to meet your own requirements.

TEXACO LUBRICATION ENGINEERS ON THE JOB FROM COAST TO COAST



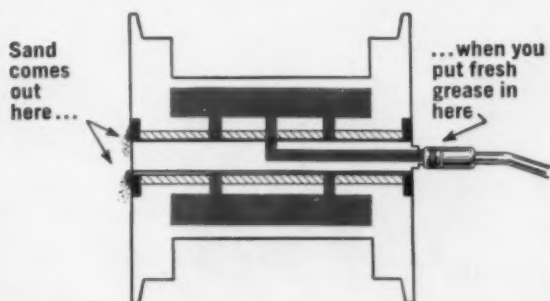
ROCKY REACH DAM AND POWERHOUSE on the Columbia River, Washington (above). W. N. Evans (left), Manager for Rocky Reach Contractors, discusses Simplified Lubrication Plan with E. S. Saunders, Texaco Contractor Sales Representative.

HOGBACK DAM, Riverton, Conn., (upper right) is part of the greater Hartford water supply system. Texaco man-on-the-job is H. F. Porter (left) shown with John Toffolon, Vice President, White Oak Contractors, Inc., General Contractors.

INTERSTATE HIGHWAY 80 PROJECT at Colfax, Iowa (right). Texaco Engineer E. A. Rolwes (right) works closely with Mott Construction Company on the important assignment of keeping equipment on the job and maintenance costs low.

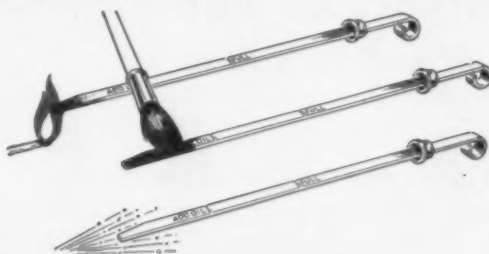


efficient maintenance



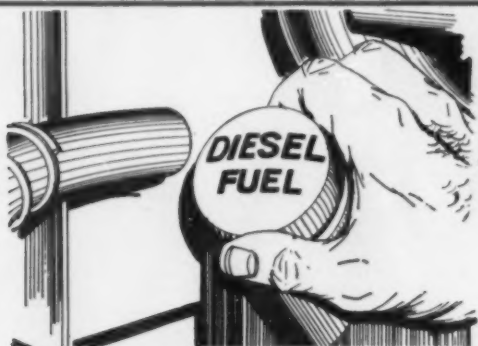
Track-roll enemy No. 1: sand

If you're operating a crawler-tractor in sandy soil, the best way to keep sand from getting into the track-roll bearings is to keep purging the bearings with fresh grease. Track-roll bearing seals are especially designed for this type of purge-lubrication, and the grease that comes out around the edges of the seal during lubrication carries the sand out with it.



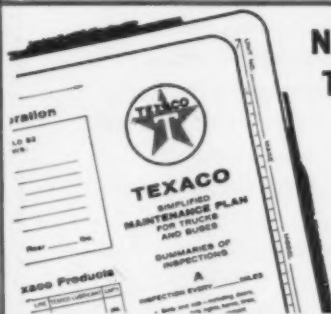
How to read dipsticks without squinting

The modern inhibited motor oil that keeps the inside of your engine clean also keeps the oil dipstick clean—and often too shiny to read. Here are three solutions for this problem—take your choice. 1. Heat the end of the dipstick so the metal darkens slightly. 2. Paint the end of the stick with a dull-finish cellulose lacquer. 3. Run the stick across the spark-plug cleaner to take off some of the shine. (If you use the spark plug cleaner, use the smallest rubber plug bushing and hold the dipstick over the hole with a wad of cloth to keep sand from scattering around the lube bay.)



Identify the fuel you want

Let one absent-minded maintenance man put gasoline in your diesel tank and as the fliers say "you'll be bailing out over Denver." It's happened. Best way to avoid its happening to you is to mark your fill cap "Diesel Fuel" or "Gasoline". Then nobody should make any mistakes.



NEW TRUCK RECORD FOLDER fits itself into your schedule

Texaco's flexible new truck record folder lets you stick to the lube schedule that works best for you without running into bookkeeping problems. Lubrication and oil schedules are completely separate from mechanical maintenance and replacement parts schedule—you don't have to follow any pre-established routine to use the folder profitably. And this new folder accounts for every single dollar you spend on truck maintenance for a whole year. Write for your folders today.



TEXACO LUBRICATION ENGINEERS

Every month we'll bring you a batch of "sleepers", little angles, so easy to overlook, where big savings in money and time can be made. But month in, month out, your local Texaco Lubrication Engineer is the best source of money-saving lubrication ideas. Don't forget that "Lubrication is a major factor in cost control."

Texaco Inc., 135 East 42nd Street, New York 17, N. Y.

Tune In: Texaco Huntley-Brinkley Report, Mon. Through Fri.-NBC-TV

TEXACO 

Throughout the United States

Canada • Latin America • West Africa

How to put a culvert to bed

(and keep it there)

One of the best things about installing Corrugated Steel Drainage Structures is the fact that an elaborate foundation is not needed. If you're laying Corrugated Culverts for roadway drainage, usually all you have to do is to smooth the grade line and straighten the channel alignment. Forget about forms and curing time; Corrugated Steel Culverts can be rolled or lowered quickly into place, back-filled, and forgotten.

Here are a few things to remember: the load-supporting capacity of a Corrugated Steel Structure depends on its foundation and the manner in which it is bedded. The foundation should be free of projecting stones, roots and debris. Corrugated Steel Culverts need not be encased because this would hinder one of Corrugated Steel's big advantages—flexibility. Back-fill should be kept clean, too, and well tamped until it reaches a minimum of $\frac{3}{4}$ of the height of the pipe. Tamping above this height is not necessary.

Quick, economical installation is just one advantage of Corrugated Steel Drainage Structures. They cost less, are free from upkeep and repair, and they're built to last.

Send for U. S. Steel's free booklet on Culvert Sheets for Metal Drainage Products. It tells all about design, sizes and weights, installation and other valuable engineering details. Write today, to United States Steel, 525 William Penn Place, Pittsburgh 30, Pennsylvania.

USS is a registered trademark

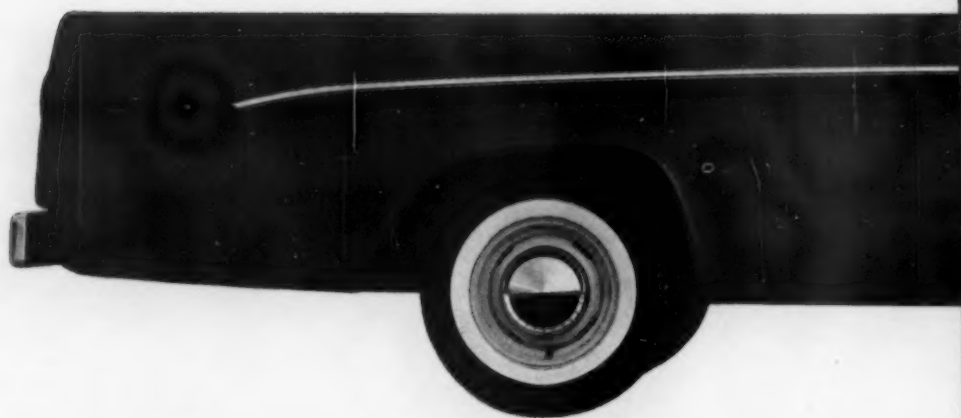


United States Steel Corporation—Pittsburgh
Columbia-Geneva Steel—San Francisco
Tennessee Coal & Iron—Fairfield, Alabama
United States Steel Supply—Steel Service Centers
United States Steel Export Company
United States Steel

This mark tells you a
product is made of
modern, dependable Steel.







FROM DODGE FOR 1961
A TOTALLY NEW KIND OF TRUCK
THE DART PICKUP
THE FIRST AND ONLY TRUCK WITH
COMPACT-ECONOMY



WHAT DO WE MEAN, THE ONLY TRUCK WITH COMPACT-ECONOMY?

We mean that the new Dart Pickup is compact in everything but work capacity. It has a compact diet. It handles like a compact. The upkeep costs are compact. But in the work department this baby is a full half-ton hauler. It'll do a sleeves-up job of work every day, day in and year out. That, mister, is what we mean by *compact-economy*. A truck that is economy-minded, a tough devil of a truck, all truck, all work, all the way.

WILL OUR ENGINE, THE NEW SLANT-6, ACTUALLY DELIVER MORE MILES A GALLON THAN COMPETITION?

There's only one way to answer that kind of question, and that's to test the new Dart Pickup against its biggest competition, Ford and Chevrolet. That's just what we did. Result? Time after time the new Slant-6, overhead valve, 225-cubic-inch engine came

out ahead on actual miles-per-gallon.

As for the engine itself, it is slanted 30 degrees from the vertical. This makes possible highly efficient manifolding, both intake and exhaust. Also gives you plenty of underhood work room which, by the way, you'll seldom need. This new engine of ours is a mighty tough customer.

Mounted on the engine, as standard equipment, is an alternating current generator. It will charge the battery even at idle. Because the battery is more fully charged, more of the time, it will last longer. Small thing? Maybe. But it saves you money.



You'll be interested to know that many of the engine parts are aluminum. Things like the water and oil pump housing, the distributor case. Extensive use of aluminum means less dead weight. More payload. *More compact-economy!*

IS IT TRUE THAT THIS TRUCK IS NEW DOWN TO THE WHEEL STUDS?

Take a look at the picture above. It's unretouched, by the way. See anything familiar? You bet you don't. This one is all-out new. Not new, mind you, for the sake of newness, but functionally new. New cab, new body. New, easier clutching, and shifting, and handling. As a matter of fact this Dart Pickup of ours even has a new soft sound. Wait'll you've had one on the job. You'll agree it's a great new way to work.

WHAT'S THIS I HEAR ABOUT A NEW THING CALLED "SEDAN RIDE"?

You know how a truck ride used to be. Not very pleasant. Well, this year Dodge has done something about it, with a virtually service-free suspension system that takes the "truck" right out of truck ride. A side benefit of this new sus-

pension is that front tires don't pay the penalty for your pleasant ride. You get every mile of rubber you paid for.

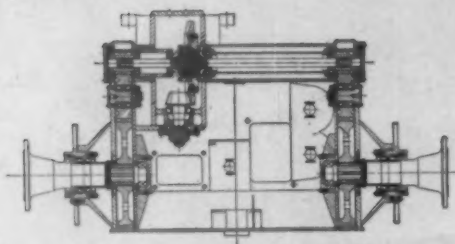
ANYTHING I OUGHT TO KNOW ABOUT THE REST OF THE '61 DODGE LINE?

Sure! You ought to know about the 1961 Dodge conventional and cab forward models, the four-wheel drive series, door-to-door jobs, the school bus chassis. There's Six and V8 gasoline power. There's Cummins diesel power. There's a weight spread of 4250 lbs. GVW to 76,800 lbs. GCW.

OK, NOW HOW DO THE PRICES STACK UP?

The new Dart Pickup and the 1961 Dodge line of trucks are priced to compete with every truck coming or going. And a Dodge truck will skin the pants off any truck for muscle, hustle and money-saving ways. You can depend on it!

SEE THE DART PICKUP



How **ALLIS-CHALMERS** mounts Timken bearings in the transmission of its TS-360 motor scraper to take heavy loads, cut maintenance.



Big capacity, big power for big economy, 28 Timken® bearings keep it rolling

THIS Allis-Chalmers TS-360 motor scraper digs, hauls and spreads 20 yards at a crack. And its big, 280-hp diesel engine means more trips per hour. With 28 Timken® tapered roller bearings to roll the loads—in outer wheels, pinion, differential, idler gear and cable unit—TS-360 users get built-in trouble-free operation, long bearing life with minimum maintenance. Here's why.

1) *The tapered construction of Timken bearings lets them take heavy radial*

and thrust loads in any combination.

2) *Full line contact between rollers and races gives Timken bearings extra load-carrying capacity.*

3) *By holding shafts concentric with housings, Timken bearings make closures more effective in keeping dirt out, lubricant in, maintenance down.*

4) *And Timken bearings are made of the finest bearing-quality alloy steel available.*

For 42 years Timken bearings have been making construction machines better. To be sure you get

better machines, make sure they're equipped with Timken tapered roller bearings. **When you buy Timken bearings you get...** 1) *Quality you can take for granted.* 2) *Service you can't get anywhere else.* 3) *The best-known name in bearings.* 4) *The pace setter in lower bearing costs.* The Timken Roller Bearing Company, Canton 6, Ohio. Cable address: "TIMROSCO". *Makers of Tapered Roller Bearings, Fine Alloy Steel and Removable Rock Bits.* Canadian Division: Canadian Timken, St. Thomas, Ontario.



Industry rolls on
TIMKEN®
tapered roller bearings

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ROADS AND STREETS

Sixty-Eight years of Editorial Leadership

Washington News Letter

By Duane L. Cronk, Director, Highway Information Services

November 10, 1960

Aside from a brief spate between Senator John Kennedy and Secretary of Commerce Frederick Mueller, the National Highway Program has been spared the bipartisan campaign wrangling that has beset many domestic programs. Even the scandals unearthed by the Blatnik Committee have not been exploited as might have been expected. This is a remarkable thing. It may mean that the program has developed such a non-partisan insulation over the years that candidates hesitate to rap it. Or it may mean that highway needs on the national level are just not a real live issue. In a sense, this is disconcerting.

The line of march against the federal gasoline tax is forming. Last month the American Automobile Association pledged an "all-out battle" to eliminate the current temporary one-cent federal gasoline tax. In a strongly worded resolution passed at the annual meeting in Cleveland, the AAA urged members of Congress to reject any efforts to extend the levy enacted in 1959. The motor club wants the Highway Trust Fund bolstered instead by transferring to it the excise taxes on automobiles, parts and accessories.

This proposal will not gladden the automobile manufacturers who intend to push heartily for repeal of the excise tax on their products.

* * *

Meanwhile, the petroleum interests have advanced their publicity effort to raise a public furor against all gasoline taxes - state and federal. Highway interests here, watching these mammoth campaigns develop, are naturally concerned about the fate of the National Highway Program if it is denied financing from such sources. The state gasoline taxes form the cornerstone of state highway improvement programs, bringing in 67% of total state highway revenues. The 4¢ federal gasoline tax funnels \$2.1 billion into the Highway Trust Fund, and the automotive excise taxes put \$1.3 billion into the general fund.

Although highway interests are reluctant to align themselves for or against specific financing proposals for the big roadbuilding program, it is obvious that they must step up their own campaign for continuation of the undertaking, regardless of where the cost falls.

This kind of effort is now progressing under the Better Highways Information Foundation whose activities were covered so well in the pages of last month's issue of Roads and Streets. Since then, the Foundation's staff has been expanded with the addition of a top-notch public relations director and a seasoned field coordinator to work with state organizations implementing the good roads program. Funds are coming in from contractors, equipment distributors and manufacturers at a pace that is most encouraging. By the time this is read, we are told, BHIF will be ready to announce the appointment of a nationally known highway leader to the top administrative post of President.

(continued on next page)

Competition for highway work continues to be brisk and sharp. An analysis of Federal-aid Primary System awards by the Bureau of Public Roads last month indicates:

That 7.2 contractors per contract bid for this kind of work, including the Interstate projects.

That low bids ran 11.1% under engineers' estimates.

The 3,762 contracts representing all federal-aid jobs during the six months period, represented sums ranging from under \$25,000 to nearly \$15 million. About 44% were below \$100,000, well within the area where small business enterprises can bid.

* * *

The highway program is coming under its sharpest attack in urban areas. The AAA had some strong words to say about this last month, too. Out-going president, Frederick T. McGuire, struck out at the "anti-automobile, anti-freeway" propagandists, charging that rail transit interests, planners, and other theorists would like to see the urban highway program wrecked or indefinitely delayed. He also spoke up for the industry and the engineering profession:

"In a program of this magnitude, involving billions of dollars and 1,500,000 people, there almost inevitably will be a few who will want to make a fast and dishonest dollar," he said. "But while using every precaution to prevent wrong-doing, let's remember the accomplishments of the vast majority of honest, dedicated people who are bringing a new highway era to America. While imposing adequate controls, let's not hamstring the men who are getting the work done. And above all, let us pledge renewed confidence in this great 41,000-mile System, insist on maintenance of high standards, and lend a hand toward bringing about its early completion."

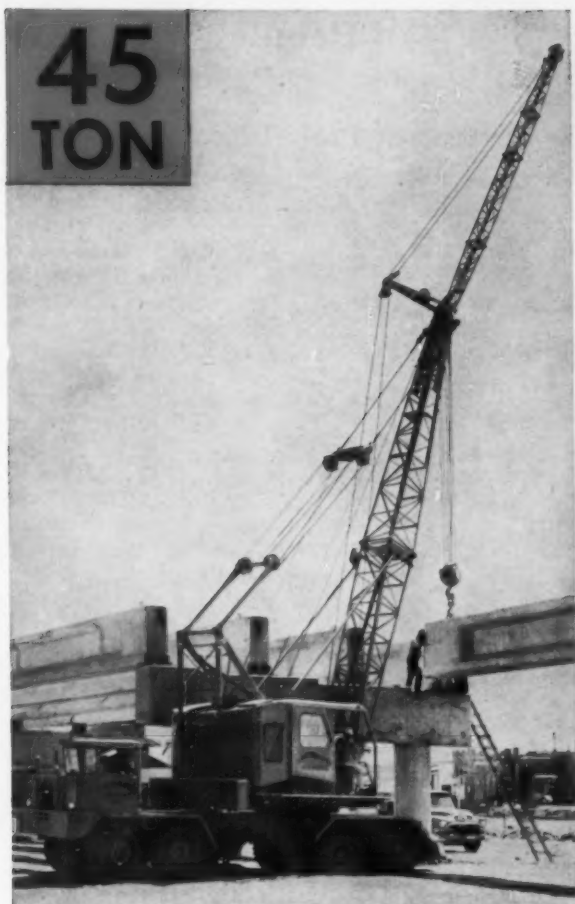
* * *

In a pre-election move that surprised no one, Secretary of Commerce Frederick Mueller announced that he was cracking the contract control program to release \$718 million in federal funds for immediate construction use. The money, although previously allocated to the state highway departments, has been tied up under the control program because of an inadequacy of funds anticipated for the Highway Trust Fund. It was originally scheduled for release January 1, 1961.

By the end of the 1961 sales season, an automotive industry spokesman here said, 50% of the automobiles sold will be compact models. Highway Officials are not concerned about any soon reduction in gasoline consumption and the revenue from gasoline taxes from this development. The major impact of the new cars cited by a traffic expert was that the records indicate more pedestrians being hit below the knees.

Out of the notebook:

Another survey of use of aggregates for highway construction has just been completed by the Bureau of Public Roads . . . The National Bituminous Concrete Association and the Associated General Contractors of America have formed a joint cooperative committee to study methods of improving the workmanship and quality of asphaltic concrete paving . . . A team of roving experts from the BPR is visiting state highway departments to help expedite acceptance of modern engineering and administrative techniques.



Koehring 445 walks precast bridge member into place on Colorado highway job.



Koehring 355 on Long Island expressway contract sets heavy concrete manhole.

UNDER LOAD OR ON THE ROAD NOTHING HANDLES LIKE A KOEHRING

Koehring heavy-duty truck cranes give you the mobility and stability to get toughest lifting assignments finished quickly. Mounted on rugged 4-axle truck, they convert quickly from fully equipped crane to roadable machine for traveling. Counter-weight, boom, and outriggers can be easily removed to reduce machine weight to meet road limits.

You get extra work capacity for safe, sure lifting and spotting. Booms have combination pin-pad connections . . . combine safety of bolted connections with quick-change advantages of pin connections.

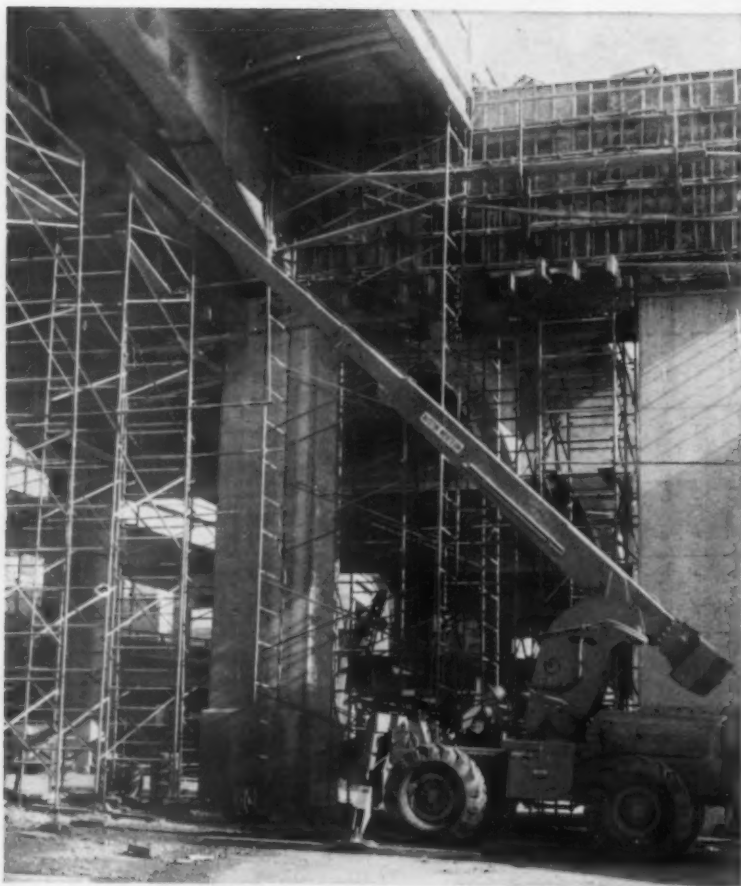
For complete information, get in touch with your local Koehring distributor or write to us for catalogs . . . do it soon.

K34

**MORE WORK CAPACITY...
MORE PROFIT PER DOLLAR INVESTED**

KOEHRING
DIVISION OF KOEHRING COMPANY
Milwaukee 16, Wisconsin

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A-W cranes reach 'hard-to-reach' places on S. F. Bay Bridge job

Peter Kiewit Sons chose an 11-ton Austin-Western Model 410 hydraulic crane for a difficult concrete handling application on a \$1,572,000 San Francisco-Oakland Bay Bridge contract.

Telescoping Boom

It was chosen for its maneuverable all-wheel steering and low overhead requirements, which permitted it to work under the lowest point (15 ft.) on the job. Yet its boom, which telescopes from 25 to 48 ft., had the required length to reach work platforms almost 50 ft. above the ground. This live-acting boom easily lifted and "threaded" buckets of concrete through small openings in a maze of scaffolding. A 7-ton Model 210, with

shorter 35-ft. reach, was also used.

Equipped with a personnel platform attachment, the cranes quickly and safely raised men to their working positions. They were also used for other tasks, involving hard-to-reach places, such as chipping concrete, demolition work on old support columns, and removing concrete forms.

Lift, carry or place

Hydraulic cranes are available in five models, 5 to 11-ton-capacity ranges. Self-propelled or stationery; wide range of optional attachments. Why not get facts and figures on these versatile rigs today. Contact your nearby Austin-Western distributor or write to our Aurora address.

Austin-Western

CONSTRUCTION EQUIPMENT DIVISION, AURORA, ILL.

BALDWIN · LIMA · HAMILTON

Power graders • Motor sweepers • Road rollers • Hydraulic cranes

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People

Prof. Holcomb Heads ASCE for 1961

Glenn W. Holcomb, head of the civil engineering department, Oregon State College, Corvallis, becomes the 92nd president of the 108-year old American Society of Civil Engineers.

Also elected at the ASCE's annual convention at Boston were regional vice-presidents: Donald H. Mattern, Knoxville, Tenn., chief of project planning, Tennessee Valley Authority; William J. Hedley, St. Louis, Mo., Chief Engineer, Wabash Railroad; and Roger H. Gilman, Plainfield, N.J., an official of the Port of New York Authority.

Directors elected included representation in the highway field through Harmer E. Davis, University of California, Berkeley, who is director of the University's Institute of Transportation and Traffic Engineering.

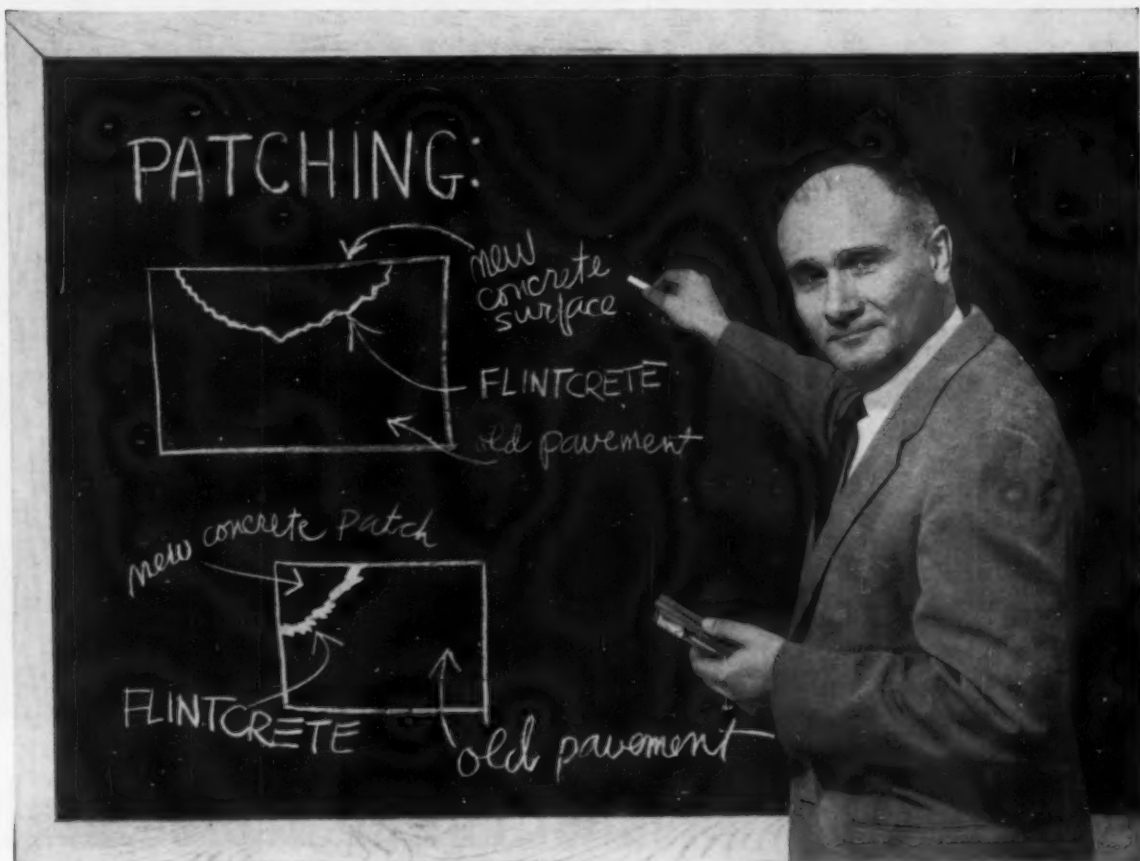
Ralph Lewis Joins Advertising Firm

Ralph H. Lewis, former managing editor of Construction Methods and Equipment, has joined The Brady Company, Appleton and Milwaukee advertising agency, in this firm's expansion program.

Lewis was formerly with Caterpillar and Athey Products for many years in advertising, sales development and industrial relations, and more recently served the Construction Equipment Division, International Harvester, for a Chicago advertising agency.

LEO K. BERRY has joined the Asphalt Institute as district engineer for central and northern California and Nevada, with office at Sacramento. Working under division managing engineer Vaughn Marker at Berkeley, Berry will furnish engineering counsel to users of petroleum asphalts in his district. He succeeds W. R. Lovering who was recently promoted to Institute's Division V as paving engineer.

Chalk talk by paving specialist "Bob" Snyder on Flintcrete—
Flintkote's amazing new polysulfide/epoxy bonding compound...



**"It's a fact! New Flintcrete* lets you do
concrete patching never before possible."**

"The secret's in Flintcrete's bonding power. It can bond concrete to concrete in a 'weld' up to 12 times stronger than concrete itself.

"This extremely high bonding strength really pays off when you're preparing existing concrete surfaces for repair. It's not necessary to remove the slab; only the unsound area need be cut away. And be certain you use a quality compound—the right one for the job at hand."

Flintcrete can be used for a wide range of other jobs too:

- bonding overlays to existing concrete surface
- bonding precast materials, markers, refractory brick
- skid-proofing pavements • surface sealing

We'll put you in touch with a qualified distributor or one of our Flintkote paving products representatives. He knows our full line and can help you.


*Trademark of The Flintkote Company



*Manufacturer of diversified products
for home and industry.*

Send today for complete technical literature giving grades available, application techniques and uses. Write: **The Flintkote Company, Paving Products Section, P. O. Box 157, Whippany, New Jersey**


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**WITH FULL-LOAD
PERFORMANCE
FULL TIME.....**

Planet Power-steered..Hi-Lo outblade clutch-steered

With exclusive "live track" Planet Power-steering, the International TD-25 makes full-load, full-power turns—or slams straight ahead with offset loads—where giant clutch-steered rigs slip and slue. With exclusive Hi-Lo, on-the-go power-shifting, the "25" gives you instant cut-to-fill matching of power to condition. You roll up big loads—and keep 'em rolling. With exclusive International DT-817 engine wallop the "25" bulls along, 230 turbocharged hp strong—without "slow-motion" lug-downs, even at high altitudes! Prove to yourself the planet-drive "25" clobbers all comers—outpushes or outpulls 'em up to 50%—*and with standard equipment*. Let your International Construction Equipment Distributor demonstrate.



◀ **Dozing volcanic cinders for railroad ballast,** this International TD-25 beats the combined production of two similar-sized clutch steered crawlers on the same job! Reason: Hi-Lo power-shifting gives exclusive 4-speed torque-converter efficiency-range control. The "25" delivers heaped loads every pass! To defy "grinding compound" conditions, the "25" undercarriage has heavy-duty Dura-Rollers.

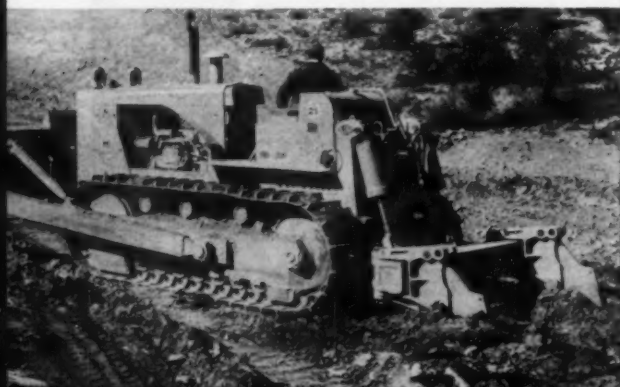


Even with an enormous offset load of shot rock there's no "bank-nosing," no sking. The TD-25 operator simply runs the load-side track in high-speed range—the other in low-speed range. Result: full-capacity, straight-ahead performance—which the "25" also gives on benching, bank-cutting, and side-casting! In the same way, you make full-load turns—because Planet Power steering eliminates "dead-track drag!"

With Hi-Lo on-the-go power-shifting you shift down, to dig hard material—shift up, to "run" with the load. And to make full-load turns without spillage, use Planet Power steering: down-shift the turn-side track, and you've got it made! When push-loading with the "25", you maintain solid contact on straight-away or curve—to speed heaping the bowls and get gear-higher "kick-outs!"

power-shifted "25's" crawlers up to 50%!

With the same 2-finger ease as on dozing or push-loading, you steer the TD-25 pulling heaviest drawbar tools. This "25" is deep-ripping "concrete-like" mountain clay that has to be shattered before dozer can move it economically. The "25" has the super undercarriage strength of double-box-beam track frames—for full-capacity performance.



**International[®]
Construction
Equipment**

International Harvester Co.,
180 North Michigan Ave., Chicago 1, Illinois
A COMPLETE POWER PACKAGE

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Meetings

NATIONAL CONVENTIONS

AMERICAN ASSOCIATION OF STATE HIGHWAY OFFICIALS—Annual Convention, Detroit, Mich.; November 27-December 2.

THE ASPHALT INSTITUTE—Annual Business Meeting, Sheraton-Park Hotel, Washington, D.C.; December 5-8.

NATIONAL CRUSHED STONE ASSOCIATION—Annual Convention, Americana Hotel, Miami Beach, Fla.; January 17-20, 1961.

NATIONAL LIMESTONE INSTITUTE—16th Annual Convention, Statler-Hilton Hotel, Washington, D.C.; January 17-19.

13TH CALIFORNIA STREET AND HIGHWAY CONFERENCE—Presented annually by the Institute of Transportation and Traffic Engineering, and University Extension, University of California, held on University's Campus, Berkeley, Calif.; January 26-28, 1961.

NATIONAL BITUMINOUS CONCRETE ASSOCIATION—6th Annual Convention, Shamrock Hotel, Houston, Texas; January 30-February 2.

ASSOCIATION OF ASPHALT PAVING TECH-

NOLOGISTS—1961 Meeting, Hotel Francis Marion, Charleston, S.C.; February 6-8.

ASSOCIATED EQUIPMENT DISTRIBUTORS—Annual Convention, Statler Hotel, Los Angeles, Calif.; February 6-9.

AMERICAN CONCRETE INSTITUTE—57th Annual Convention, Chase-Park Plaza Hotels, St. Louis, Mo.; February 20-23.

LOCAL CONVENTIONS

THE CAROLINAS READY-MIXED CONCRETE ASSOCIATION—Annual Meeting, Sedgefield Inn., Greensboro, N.C.; November 13-15.

ACC OF NORTH DAKOTA—Annual Convention, Williston, N.D.; December 4-6.

ACC OF ILLINOIS—Annual Convention, Springfield, Ill.; December 5-6.

WISCONSIN BITUMINOUS PAVING ASSOCIATION—4th Annual Convention, Edgewater Hotel, Madison, Wis.; December 6.

MICHIGAN ROAD BUILDERS ASSOCIATION, INC.—Annual Season-End Meeting,

Sheraton-Cadillac Hotel, Detroit, Mich.; December 7-8.

ACC OF WYOMING—Annual Convention, Casper, Wyo.; December 15-16.

ACC, SOUTHERN CALIFORNIA CHAPTER—Annual Meeting, El Mirador Hotel and Palm Springs Riviera, Palm Springs, Calif.; December 16-18.

ACC OF NEBRASKA—Annual Convention, Hotel Fontenelle, Omaha, Nebr.; January 10-11, 1961.

ACC OF MISSOURI—Annual Meeting, Hotel Muehlebach, Kansas City, Mo.; January 11-12.

ACC OF MINNESOTA—42nd Annual Convention, Hotel Leamington, Minneapolis, Minn.; January 12-14.

ACC OF IOWA—39th Annual Convention, Savary Hotel, Des Moines, Iowa; January 18-19.

CONSTRUCTORS ASSOCIATION OF WESTERN PENNSYLVANIA—Annual Meeting, Pittsburgh Hilton Hotel, Pittsburgh, Pa.; February 3.

KENTUCKY ASSOCIATION OF HIGHWAY CONTRACTORS—Annual Convention, Kentucky Hotel, Louisville, Ky.; February 24-25.

BREAKING CONCRETE

...a fast, cost-saving job for

ARROW

Side-Action Mobile Hydraulic Hammer

Breaking 9" of reinforced concrete bridge decking overlaid with 4" of asphaltic paving was the job given the Arrow Hammer pictured at right. The decking was on the Bradford-Carlton Bridge, crossing the Allegheny River near Salamanca, New York.

The job superintendent reported that the one Arrow Hammer did more work in a single 8 hour shift than 4 jack hammers could have done in a full working week. The savings resulting from the use of the Arrow Hammer were important to the contractor's over-all profit on this project.

Breaking concrete is only one task where the Arrow saves you money. It also lowers costs for cutting asphaltic paving, tamping trench backfill and driving short piling and guard rail posts. It is ideally suited for demolition jobs.

For complete information and a free demonstration, call your Arrow Distributor or WRITE FOR DESCRIPTIVE LITERATURE.

ARROW MANUFACTURING COMPANY

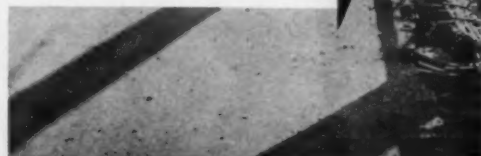
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26



The Side-Action Arrow can work close to obstructions, such as bridge railings. It can hammer a distance of 8 feet across the front of the machine.

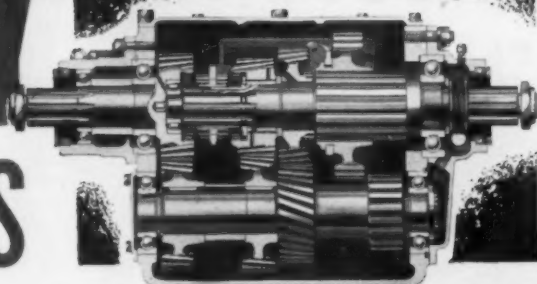


ROADS AND STREETS, November, 1960

NEW 4-SPEED AUXILIARY TRANSMISSIONS

For Medium-Heavy Duty Trucks and Tractors

MODELS 4-B-73 AND 4-B-75



SPLIT GEARS AND *GO*...SHIFT INTO DEEP REDUCTIONS AND *PULL*

You no longer have to pay a premium price for a 4-speed auxiliary which is heavier than your operation demands. Save weight *and* money with one of the new Fuller 4-speed Auxiliaries equipped with overdrive, direct, low and low-low gear ratios in one compact, 375-pound unit. Get gear-splitting ratios plus deep reduction.

The Fuller 4-B-73 is designed for use with engines producing approximately 500-600 lb./ft. of torque. Use of special high-capacity bearings permits the 4-B-75 to be used with engines in the 600-700 lb./ft. torque class.

Get all the extras of price, performance and payload. Specify the new Fuller 4-B-73 or 4-B-75 4-speed Auxiliary Transmissions. For full details, see your truck dealer or write Fuller Manufacturing Company.

GEAR RATIOS
Models 4-B-73 and 4-B-75

Overdrive	.85
Direct	1.00
Low	1.24
Low-Low	2.22

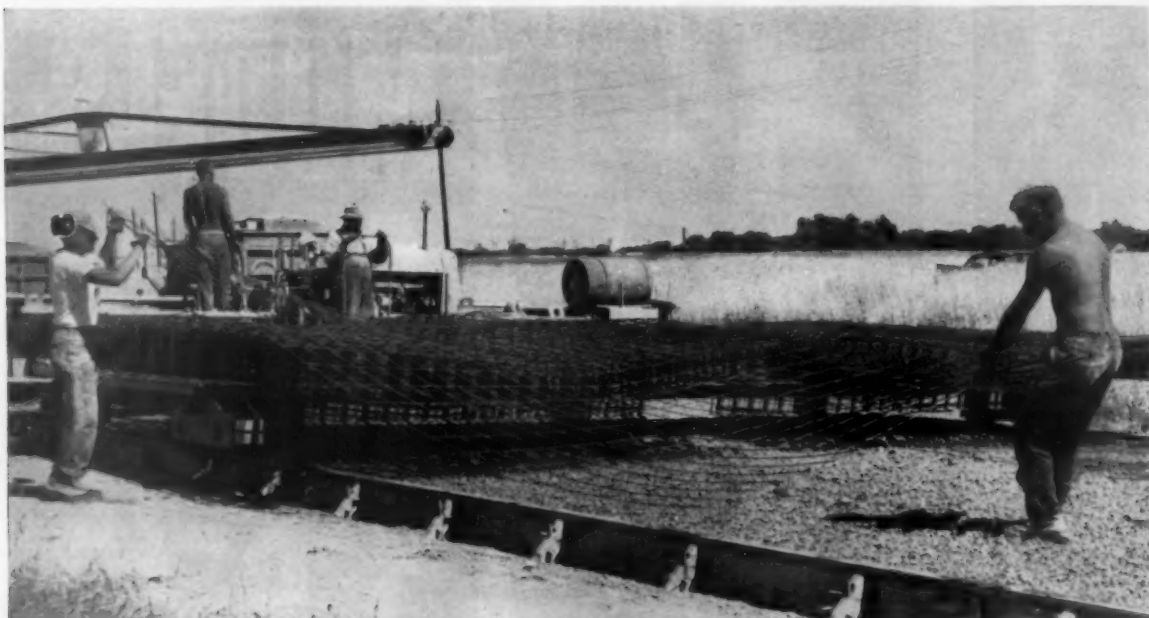
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Unit Drop Forge Div., Milwaukee 1, Wis. • Shuler Axle Co., Louisville, Ky. (Subsidiary) • Sales & Service, All Products, West. Dist. Branch, Oakland 6, Cal. and Southwest Dist. Office, Tulsa 3, Okla.
Automotive Products Company, Ltd., Automotive House, Great Portland Street, London W.1, England, European Representative

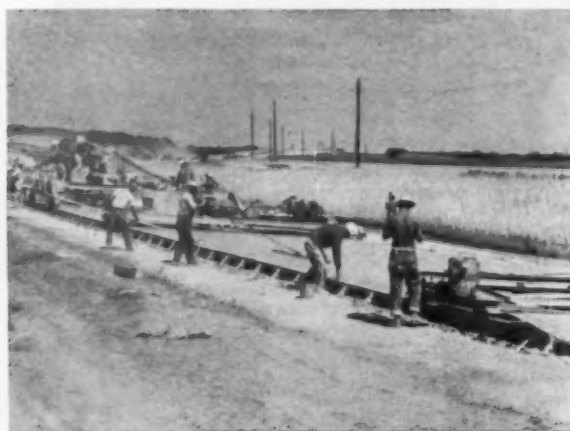
ROADS AND STREETS, November, 1960

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TRUSCON WELDED WIRE FABRIC

Shipped on Schedule Saves You Time and Money!



These highway construction scenes were taken on the job at Austin, Minnesota. Hallet Construction Company used Truscon Welded Wire Fabric the entire length of the job. Specify Truscon for your next project.

Truscon's new and enlarged fabricating facilities for Welded Wire Fabric have a tremendous production capacity and your shipping requirements can be met. The assurance that your reinforcing material will be on hand when needed, eliminates costly delays in waiting time and idle equipment.

Truscon Welded Wire Fabric is produced from cold drawn steel wire. New equipment assures uniformity of product from end-to-end. Provides built-in quality for predictable, dependable performance.

Truscon Welded Wire Fabric lies flat. Concrete flows on easily, works in evenly. Clings to the wire fabric surface. Sets up with strength distributed equally in four directions.

To learn more about the many advantages and economies of Truscon Welded Wire Fabric, call your Truscon representative, or send coupon below.



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Please tell me more about the advantages and economies of using Truscon Welded Wire Fabric.

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Firm _____

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Handle the "TRICKY" jobs with **GREATER EASE!**

IT isn't *this* or *that* that gets a crane job done. Your crane problem today is different tomorrow. The machine you need had better not be a one-feature rig.

Here's a bridge job! Four men on the forms! Reinforcing to set and a pour to make! A situation that calls for perfection in operation and smooth response to the operator's need for performance. Northwest Cranes bring you the finest combination of advantages available for the tricky jobs. This operator has smooth, dependable booming guaranteed by the rugged, Independent High Speed Boom Hoist. He can boom up and down continuously under heavy load without over-heating or fading. He has a heavy duty assembly designed for varied crane work.

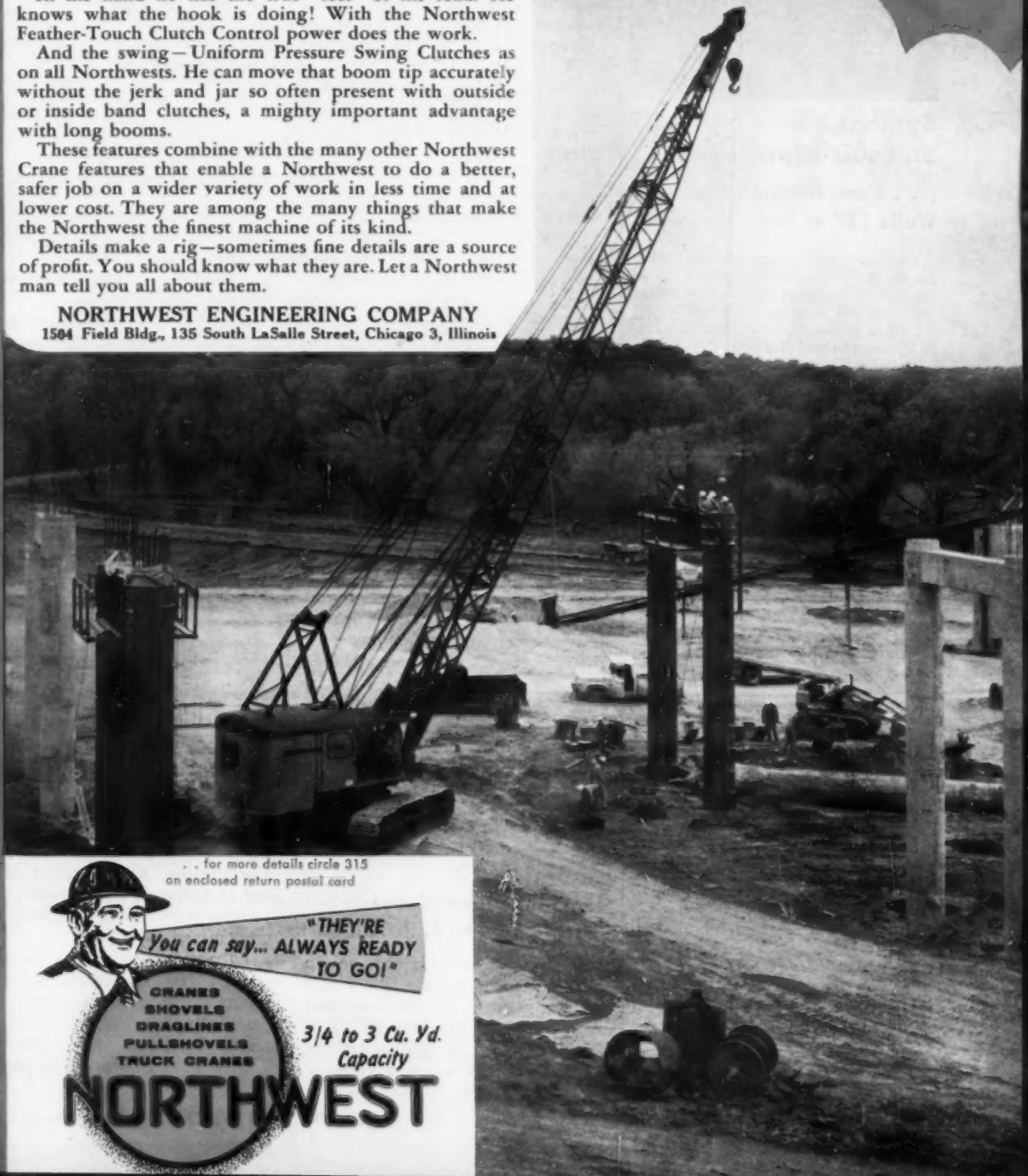
In his hand he has the true "feel" of his load. He knows what the hook is doing! With the Northwest Feather-Touch Clutch Control power does the work.

And the swing—Uniform Pressure Swing Clutches as on all Northwests. He can move that boom tip accurately without the jerk and jar so often present with outside or inside band clutches, a mighty important advantage with long booms.

These features combine with the many other Northwest Crane features that enable a Northwest to do a better, safer job on a wider variety of work in less time and at lower cost. They are among the many things that make the Northwest the finest machine of its kind.

Details make a rig—sometimes fine details are a source of profit. You should know what they are. Let a Northwest man tell you all about them.

NORTHWEST ENGINEERING COMPANY
1504 Field Bldg., 135 South LaSalle Street, Chicago 3, Illinois



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"THEY'RE
You can say... ALWAYS READY
TO GO!"

CRANES
SHOVELS
DRAGLINES
PULLERS
TRUCK CRANES

3/4 to 3 Cu. Yd.
Capacity

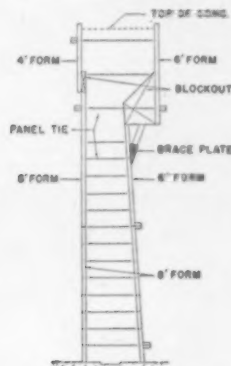
NORTHWEST

Battered Walls



Symons Forms on St. Louis Expressway ... Form Double Battered Walls 12" at Top, 3' at Base

On the downtown phase of the St. Louis Mark Twain Expressway, contractor R. B. Potashnick & J. S. Alberici Construction Company used 8,000 sq. ft. of Wood-Ply and 20,000 sq. ft. of Symons Steel-Ply Forms.



Job called for retaining walls, many of them double battered so that forms were angled to give 12" top thickness and up to 3' thickness at base. Heights varied from 4' to 34'. In addition, the forms were used to pour footings, abutments, piers and beams. Contractor obtained 30 re-uses.

Symons Forms may be rented with purchase option. Additional information on how to use Symons Forms for battered walls sent on request.



SYMONS CLAMP & MFG. CO.
4283 Diversey Ave., Dept. LO, Chicago 39, Ill.

• MORE SAVINGS FROM SYMONS

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New Publications

Bridge Waterway Hydraulics

Hydraulics of Bridge Waterways. By the Bureau of Public Roads, U.S. Department of Commerce. First of a proposed series on hydraulic design of highway drainage structures. The 53-page illustrated publication is available from the Superintendent of Documents, U.S. Government Printing Office, Washington 25, D.C., at 40 cents per copy.

The bulletin gives simplified methods for computing backwater caused by bridges, developed from extensive model tests and checked against field measurements. The empirical curves and methods of calculation contained in the new publication have been subjected to extensive field use during the past few years by state highway departments, consulting engineers, and the Bureau of Public Roads, and a number of improvements developed during this period are incorporated.

As noted in the introduction to the publication, hydraulics should play an important role in establishing what the length and vertical clearance of a bridge should be, and where the bridge should be placed. Confining flood water unduly may well cause excessive backwater with resultant damage to upstream land and improvements and overtopping of the roadway, or may induce excessive scour endangering the bridge itself. Too long a bridge may cost far more than can be justified by the benefits obtained.

The publication is intended to provide within the limitations described, a means of computing the effects of a given bridge upon the flow of the stream it is proposed to span.

De-Icing Procedures With Calcium Chloride

Engineers planning to obtain clear pavement quickly this winter will want to consider data from tests of ice melting chemicals. Made at the University of Minnesota, the tests show that calcium chloride

melts eight times as much ice as rock salt in the first 30 minutes at 20 degrees F. At 10 F, according to the Calcium Chloride Institute, salt melts only 22 percent as much ice as calcium chloride in the first hour.

The above data are from an information circular "Winter Maintenance: Ice Control," which also contains data on use of chemical mixtures. Single copies are free on request to the Calcium Chloride Institute, 909 Ring Building, Washington 6, D. C.

Manual Available on De-Icing Abrasives

When motorists need immediate traction on hazardous, ice covered roadways, spreading of calcium chloride treated abrasives provides positive results.

For engineers who desire specific information on this subject, the Calcium Chloride Institute has prepared Manual IM-1 "Calcium Chloride for Ice Control." Its 30 pages of illustrated text include recommendations for treating and storing abrasives, spreading abrasives, and direct application of calcium chloride. Copies are free on request to the Calcium Chloride Institute, 909 Ring Building, Washington 6, D. C.

ASPHALTIC CONCRETE CONSTRUCTION: Field and Laboratory Studies. Bulletin 251, The Highway Research Board, 2101 Constitution Ave., Washington 25, D. C. Price \$1.00. This publication contains the following reports:

Full-Scale Asphaltic Construction in the Research Laboratory, by R. J. Schmidt, California Research Corporation; a description of the use of full-scale paving equipment in laboratory testing of asphalt concrete mixes.

Laboratory and Field Densities of Hot-Mix Asphaltic Concrete in Texas, by Bob M. Gallaway, Research Engineer, Texas Transportation Institute. Comparison of

Continued on page 33



***There's a type and size
just right for your job!***

Whatever your off-highway hauling work may be—heavy construction, mine, quarry and industrial jobs—there's a job proved "Euc" that can cut your costs and step up production. With unmatched field experience and parts and service facilities of a world wide dealer organization, Euclid Rear-Dumps meet today's requirements for big performance on the toughest jobs.

For facts and figures proof that "Eucs" can mean lower costs on your work and are your best investment, call the Euclid dealer that serves your area.

EUCLID Division of General Motors, Cleveland 17, Ohio
Plants at Cleveland and Hudson, Ohio and Lanarkshire, Scotland



EUCLID EQUIPMENT

FOR MOVING EARTH, ROCK, COAL AND ORE

R-10 ^{TEN} TONS

R-18 ¹⁸ TONS

R-22 ²² TONS

R-27 ²⁷ TONS

R-40 ⁴⁰ TONS

R-55 ⁵⁵ TONS

PLUS

**12, 22 and
35-TON**

**SEMI-
TRAILER
REAR-
DUMPS**



3½-yd. Lima 1250 shovel loads blasted rock in Canadian quarry.

Air-controlled Lima 1250 speeds rock loading

If you want to move more rock faster, easier and more profitably—Lima's the shovel for you!

Take the Lima 1250 as an example. Its main and auxiliary functions are air-controlled for smooth precision performance at full capacity operation. Torque converter, with either Diesel or electric power, reduces shock loading . . . makes heavy digging and rock handling easy on both machine and operator. The type 1250 can be knocked down for over-the-road transfer from job to job.

All Limas can be depended upon to boost profits, because they are top-quality machines designed and built to outperform other makes.

This also results in consistently high production with

a minimum of downtime and years of trouble-free, low maintenance service.

There's a Lima type and size for every pit and quarry operation. Shovels to 8 cu. yds., draglines variable. Limas easily convert to cranes—up to 140 tons on crawlers. Choice of power; crawler, wagon or truck mounted.

It won't cost a cent to investigate Limas before you buy your next shovel or dragline—and it might pay off handsomely in increased profits and reduced maintenance costs. Talk to Lima owners. Ask for facts and figures from your nearby Lima distributor or write to Construction Equipment Division, Baldwin-Lima-Hamilton Corporation, Lima, Ohio.

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LIMA Construction Equipment Division, Lima, Ohio
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Shovels • Cranes • Draglines • Pullshovels • Roadpackers • Crushing, Screening and Washing Equipment

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New Publications

Continued from page 30

density of mixes produced in the laboratory with density of similar mixes in place after several months of traffic. The authors also describe absorption of asphalt by the aggregates in a mix.

Behavior of Hot Asphaltic Concrete Under Steel-Wheel Rollers, by R. J. Schmidt, W. J. Kari, H. C. Bower, and T. C. Hein, respectively; California Research Corporation, American Bitumuls and Asphalt Co., American Bitumuls and Asphalt Co., and California Research Corporation. A report on compaction of hot asphaltic concrete using steel-wheel rollers with guides for obtaining the best compaction under a variety of situations.

ACI Bibliography Covers Fatigue of Concrete

Researchers in the field will welcome the American Concrete Institute's newly published bibliography, "Fatigue of Concrete."

The bibliography lists and annotates 114 significant works published since 1898. No other comprehensive bibliography in this field is available, according to ACI Committee 215 on this subject, which searched major technical publications of many countries to compile the references. The bibliography is available free on request to The American Concrete Institute, P.O. Box 5754, Redford Station, Detroit 19, Michigan.

CONSTRUCTION CONTRACTING. A book by this title, 382 pages, has been published by John Wiley & Sons, 440 Park Avenue, New York 16, N.Y. Price \$9.75.

Prepared by Richard H. Clough, Dean, College of Engineering, University of New Mexico, this book presents a comprehensive and integrated treatment of a contractor's

office practices and management techniques.

The various chapters discuss five basic management functions: organizing, staffing, directing, planning, and controlling. Valuable reference data are included on such matters as construction insurance, contract bonds, and labor legislation.

CLASSIFICATION OF MOTOR VEHICLES, 1956-57. Published by the Bureau of Public Roads, U. S. Department of Commerce. Reports detailed information on the number of vehicles registered in 1956, with an estimate for 1957, classified according to type of vehicle, kind of fuel used, gross vehicle weight, and type of use - farm, nonfarm, for-hire, and publicly owned. Available from the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C., at 75 cents per copy.

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Do you need a caisson drilling machine that is completely mobile?

Williams builds it!

Does your drilling projects require equipment capable of boring at all angles?

Williams builds it!

Do you want a unit which can use helical augers, drilling buckets, or underreamers equally well?

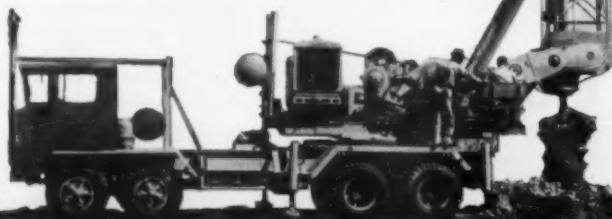
Williams builds it!

Would you like to operate an earth boring machine which is stabilized and positioned hydraulically?

Williams builds it!

Why doesn't someone build a machine which incorporates all of these advantages?

Williams does!



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CORRUGATED METAL CULVERT PIPE BY WHEELING



Problem: Because outdated bridge is used regularly by heavy logging trucks, bridge requires monthly inspection, frequent maintenance

Best way to "modernize" old bridges!

Why fight an endless battle to maintain old bridges? Especially when you can replace these "budget eaters" with low-cost Wheeling Corrugated Metal Culvert Pipe. Just look at the advantages it has!

Resistance to shock and vibration—Unlike concrete pipe, Wheeling Corrugated Culvert Pipe is flexible. So it absorbs the severe shock caused by shifting fill and heavy trucks.

Amazing strength—This same flexibility makes Wheeling Culvert Pipe far stronger, because it enables the pipe to "borrow" strength from the surrounding earth (see for yourself

by conducting this simple test with your garden hose).

Won't disjoint—Wheeling Culvert Pipe adjusts to the pressures created by shifting fill because it has beam strength... and Wheeling Culvert Connecting Bands grip both pipe ends securely.

Special end treatments—Never a problem! You always get fast, economical service on special end treatments, including skews and bevels, from your nearby Wheeling Culvert Plant.



WHEELING CORRUGATING COMPANY

Warehouses: Boston, Buffalo, Chicago, Columbus, Detroit, Kansas City, Louisville, Minneapolis,



Solution: *Wheeling Large Diameter Corrugated Metal Culvert Pipe easily handles peak stream flow . . . absorbs shock created by logging trucks.*

Special finishes — For corrosive or abrasive situations, Wheeling supplies special finishes, including full and partial bituminous coatings with or without paved inverts.

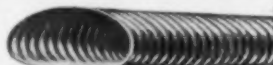
You always get fast delivery on Wheeling Culvert Pipe and Fittings because Wheeling maintains special culvert plants at Des Moines, Detroit, Kansas City, Louisville, Madison, Wis., Mar-

tins Ferry, Ohio, Minneapolis, Peoria, Ill., Philadelphia and St. Louis.

Get the whole story on Wheeling Corrugated Metal Culvert Pipe (both copper-bearing steel and copper-bearing pure iron) from your Wheeling man this week. Or write directly to Wheeling Corrugating Company, Wheeling, West Virginia.



USE WHEELING CULVERT PIPE HERE, TOO!



Where headroom is limited, use special wide-based Wheeling Pipe Arch.



For efficient roadside drainage, use Wheeling Small Diameter Culvert Pipe.



For deep, fast-flowing streams, use Wheeling Large Diameter Culvert Pipe.



For deep, shifting fill, use Wheeling Large or Small Diameter Culvert Pipe.

IT'S WHEELING STEEL!

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ROADS AND STREETS, November, 1960



Tennessee Road Builders Scholarship

Pictured here is the presentation of the Tennessee Road Builders Association's annual \$500 scholarship to a Vanderbilt University civil engineering student.

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For Paving or Patching

HOT WITCH

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- 18" Roller width
- Handle extends to 10'
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Leslie T. Hart, executive secretary for the Association is giving check to Terry Lee Stumph, this year's recipient. Standing, left, is Dean Robert S. Rowe of the Vanderbilt University School of Engineering and Prof. William H. Rowan, head of the civil engineering department.

Stumph was selected by the Scholarship Committee of the University and was later approved by the Board of Directors of TRBA. The scholarship is part of the Association's contribution to help encourage talented young men to enter engineering and highway work.

Subcontractor Bids Get Four-Hour Deadline

Contractors, subcontractors and building material suppliers who annually handle nearly \$1 billion of construction in eleven Southern California counties have agreed to new bidding rules. A pact has been signed, designed to improve bidding practices on private and public construction projects where a predetermined time for bidding has been established. While the development chiefly concerns the building industry the area's road contractors are also affected.

All subcontractor bids under the new setup must be turned in to the general contractor *at least four hours* before the general bid is submitted to the awarding authority.

Spokesmen for the construction industry explained that when advertising for bids, agencies responsible for both private and public construction projects usually set a deadline for the time bids are to be received.

Under previously existing practices, subcontractors could submit their bids to the general contractor right up until the deadline. In an effort to make his general bid as low as possible, the general contractor thus has been forced to accept a low sub-bid without having time to investigate the sub-bidder. If the unknown sub-bidder is not capable of performing, the general contractor must make good on the job even though he suffers a loss.

On the other hand, it is pointed out, qualified subcontractors have been forced to hold off their bids until the last moment for fear their bid would be revealed to competitors.

Under the new procedure the four-hour moratorium will permit the general contractor to check the credit, integrity, experience and responsibility of all sub-bidders. At the same time it will give the sub-bidder added confidence as there will be no opportunity for his bid to be revealed to competitors.

The groups in this pact include Building Contractors Association, Home Builders Association, Engineering and Grading Contractors Association and the Southern California Chapter, Associated General Contractors of America.

Warren Driver, president of the AGC's Southern California Chapter, and J. W. Bernard, immediate past president of the chapter and chairman of the committee which drafted the agreement, said that the new bidding procedure will promote materially the interests of the public and the construction industry.

NEW FROM CHEVROLET

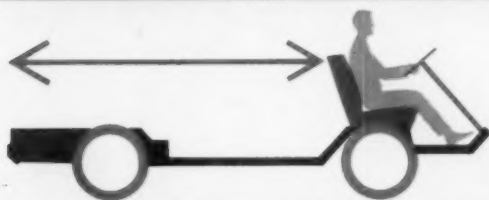
☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆
!!!WING-DING OF A TRUCK



OLET
K IDEA!!!

DRIVER'S UP FRONT

★★★★★★★★★★★★★★★★★★
!! ENGINE'S IN THE REAR !!



ALL THE REST IS LOAD SPACE

What you see here is not merely a new truck model . . . *it's a new kind of truck*. An efficient truck design that gives you many more feet of load space than a conventional half-tonner because of a unique build that eliminates the hood. A design that puts out new working efficiency by putting the engine and transmission in the rear. (Of a Corvair 95's short 15-foot length, *nearly 9 feet is for cargo!*) Here's a truck weight that's distributed *evenly*, front and rear, to enable a Corvair 95 to carry up to 1,900 lbs. of payload with a trim 4,600-lb. GVW. Here's a short 95-inch wheelbase that pays off in easy, nimble maneuvering.

Dollar-saving performance starts with the engine—an air-cooled space-saving “pancake” 6 that never needs antifreeze or radiator repairs . . . and never stops whittling down fuel costs! Ideally suited for trouble-free truck duty, also, is the tough chassis build of Corvair 95, which includes frame and body designed as a rugged one-piece unit to withstand slam-bang runs. And there's *4-wheel independent suspension* (first time in a U.S. truck!) to add stability to truck performance and to take the roughness out of road surfaces.

The list of Corvair 95 design advantages is as long as your arm. There's *low* loading height, for example: load space so accessible that the truck practically loads and unloads itself! And there's exceptional driver comfort in the roomy cab. (With no hood projecting out in front, visibility has never been better.)

It's a wing-ding of a truck idea—a big Chevy “first,” available in pickup and panel body versions. Look 'em over right here.

★ NEW LOADSIDE PICKUP

More load space than conventional half-tonners! • Full-width pickup box gives 80 cubic feet of load space!

- Big 1,900-lb. cargoes, with trim 4,600-lb. GVW
- Deep-well cargo area midship for tall, bulky loads
- Low 14" floor height saves work when loading
- Optional (extra cost) flat floor gives 39 sq. ft. of flat loading area, plus cargo-stowing area underneath!
- Sturdy integral body-frame design
- Independent 4-wheel suspension
- Short wheelbase and turning radius for easy handling and parking



★ NEW CORVAN

Worlds of load space—109" long, 60" wide and 54" high at center! • High 1,800-lb. payload capacity! • *Big* double doors that open so wide you can load a 4' x 4' crate with ease (right-side doors standard, left-side doors optional at extra cost). • Wide-opening double rear doors! • Easiest loading—low 14" loading height . . . door stops that hold doors open at 100- and 180-degree angles • High interior height for convenient cargo handling • Snappy styling—high, wide side panels that allow plenty of space for your advertising.



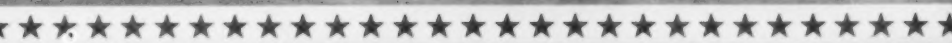
★ NEW RAMPSIDE PICKUP

No-lift loading—exclusive Corvair 95 Rampside pickup feature! • Wide, ruggedly built side gate drops down to form a convenient ramp for easy, no-lift loading! • When closed, ramp fits flush with body side; and it's safety-latched to stay tight and rattle-free • 80 cubic feet of load space in big pickup box! • Flat floor, optional at extra cost, gives 39 sq. ft. of flat loading area • *Low* loading height! • Comfortable cab!

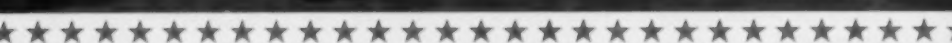




NEW CORVAIR 95 LOADSIDE



NEW CORVAN



NEW CORVAIR 95 RAMPSIDE

NEW!!!! CHEVROLET CORVAIR 95 TRUCKS

They're the *newest* load-pullers since horses went out of style! The most efficiently designed trucks you've ever seen, loaded with scores of new advantages, such as these:

ECONOMY OF AN AIR-COOLED REAR ENGINE—the aluminum Turbo-Air 6. No antifreeze to buy; no radiator repairs to worry about. Fast warm-up keeps fuel costs down. And when you need a burst of speed, this one really skedaddles!

EASY TRACTION WHEN RUNNING EMPTY. Snowy or mud-clogged routes pose no problem for Corvaire 95. This new design puts engine weight in the rear, for deep-biting traction that gets you through.

UNIPACK FOR FAST, EASY SERVICING. Engine, transmission and rear axle are combined in one strong, efficient unit. A space-saving package that can be removed in minutes to speed up service, reduce downtime. Convenient access panels make routine maintenance easier.

MORE LOAD SPACE, LESS ROAD SPACE. With nearly 2 feet less overall length, a Corvaire 95 eases into tight spots like no conventional half-tonner can. But Corvaire 95's carry bigger cargoes—nearly two-thirds of the length is for load space!

RUGGED UNITIZED BODY-FRAME CONSTRUCTION. Tough, integral floor-frame assembly reduces truck weight, helps provide low loading height. Welded all-steel front, side and roof panels add more strength. Corvaire 95's are built to last!

LESS TRUCK WEIGHT ALLOWS MORE CARGO WEIGHT. Corvaire 95's weigh up to 1,200 lbs. less than corresponding conventional models. Yet they'll carry 1,900 lbs. of cargo!

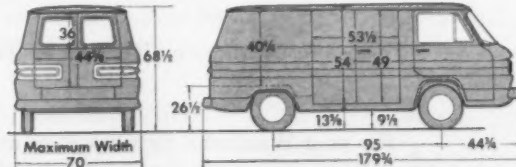
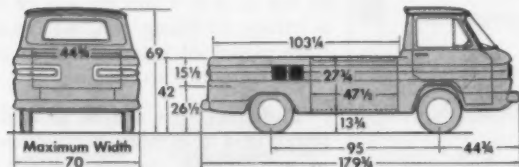
BALANCED 50-50 WEIGHT DISTRIBUTION. Load space located midship results in big cargo-carrying capacity. Husky 2,500-lb.-capacity front and rear suspensions carry nearly equal loads to reduce strain on chassis and tires.

SMOOTH INDEPENDENT 4-WHEEL SUSPENSION. Smooth sailing on bumpy streets results from balanced friction-free coil springs at all four wheels. Independent wheel action adds to handling ease. A sturdy suspension that withstands any duty!

SHORT WHEELBASE MANEUVERABILITY. Corvaire 95's are easiest to get around in. Turning radius (under 20 feet) is less than that of ordinary trucks. That means easier maneuvering and parking, faster hauls in congested areas.

EASIEST TO LOAD. Exclusive Rampside pickup side gate drops down to make cargo loading a snap. Big Corvan side doors open so wide you can load 4' x 4' crates with ease. And Corvaire 95 rear loading heights, low as those of conventional models, will save you work every time out.

And that's not the whole story, by any means. There's rugged *truck-built* construction that shows up best when the going's worst . . . snappy styling with high, wide side panels that allow plenty of space for advertising . . . and much, much more. Visit your nearby Chevrolet dealer soon and get all the details. . . . Chevrolet Division of General Motors, Detroit 2, Michigan.



1961 CHEVROLET STURDI-BILT TRUCKS

CHEVROLET

**"There is hardly
anything in the world
that someone cannot
make a little worse and
sell a little cheaper
—and the people who
consider price alone are
this man's lawful prey."**

—John Ruskin

*you can buy a cheaper engine...
but you can't buy a better one*

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Famous in Construction Work for 40 Years

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Glowing Highways

Highway pavements that may be "turned on" at night were described recently by Sylvania Electric Products Co.

The Panelescent lamp, as it is known, produces light over the entire surface of a metal panel by the principle of electroluminescence, in which the light is created by the excitation of certain phosphors in an electrical field. The lamp is reported to produce a uniform light without the use of bulb or tube, filaments or cathodes. Although this lamp is being used now in relatively small applications, the company can produce panels up to five ft. by three ft. in size.

Some of these lamps can produce a brightness of 1,000 ft. lamperts, although these are in an experimental stage. Most Panelscent lamps in current commercial use are rigid and have a steel base but flexible lamps based on plastic have been demonstrated. The company anticipates the development and production of a variety of directional signs for outdoor use.

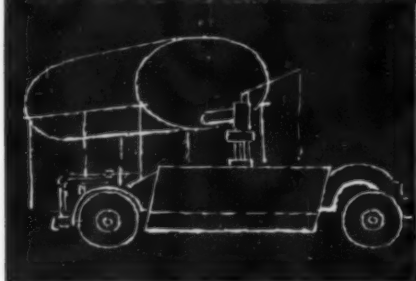
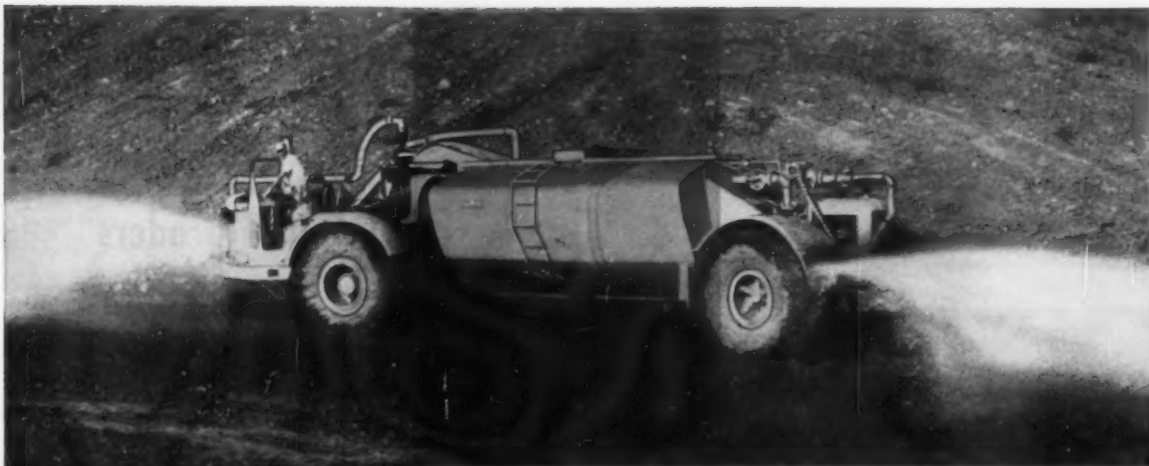
Contractor Talks Costs With His Staff

(From "Hendrickson News," employee magazine of Hendrickson Bros., Inc. General Contractors, Valley Stream, N. Y.)

It is an open secret that there is a direct connection between prices bid for new work and the costs previously experienced when producing similar output. For example, if we were to bid on the building of a skyscraper we would have nothing on which to base the figures, because we never before engaged in that type of construction.

If, on the other hand, we were to bid on a dirt moving job, or say a bridge building job, we would have plenty of information in our books on which to base our bid.

Therefore it is simple to understand that the more economically we work today, the surer we will be the winner of tomorrow's bids. If we have become somewhat lax in keeping down costs, let us perk up and look toward the future with a better feeling of security.



10,000 GALLONS AT A CRACK!

**...MEANS FEWER TRIPS TO WATER-UP,
MORE TIME SPRINKLING**

**Yuba-Southwest big gallonage
sprinkler tanks cut costs,
speed up the job: sizes up
to 10,000 gallons**

*Yuba-Southwest also manufactures
MULTIPLE-BOX
COMPACTION ROLLERS
SELF-PROPELLED ROLLERS
SHEEPSFOOT ROLLERS*

Yuba-Southwest Semi-Trailer Sprinkler Tanks are designed and engineered to help contractors slash time and costs watering down big earthfills.

They are built in big-gallonage capacities only, ranging from 5,000 to 10,000 gallons, to reduce by as much as one-half the number of non-productive trips to the water source for tank filling. This minimizes a manpower cost problem ever present when conventional "piggyback" gasoline-type sprinkling tanks of small 2,000 to 3,000 gallon capacity are used.

Equipped with large, high-flotation, low-pressure tires, these big Southwest Sprinkler Tanks can work way out on deep, soft fill without losing traction or bogging down. With pressure spray bars both front and rear, and gravity bar under the tank, they provide faster area coverage with greatest possible water penetration.

Yuba-Southwest Sprinkler Tanks are adaptable for use with Caterpillar DW-21, DW-20 and DW-15 Tractors and other suitable prime movers. Various draft beam or hitch arrangements are available. Get complete information—today.



specialists in compaction equipment

Yuba Southwest Products are Sold and Serviced by Your Caterpillar Dealer

SOUTHWEST WELDING & MANUFACTURING DIVISION
3201 W. Mission Road, Alhambra, Calif.

YUBA CONSOLIDATED INDUSTRIES, INC.

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SNOW MUST GO!

-when you use
Snow Plow and Wing
Attachments on your
GALION Graders



Galion "V" type Snow Plows are sturdily constructed and braced for heavy-duty service. Renewable cutting edge of high carbon steel. Sliding shoes, with renewable wearing plates, prevent plow from digging into the road surface. Plow is independently operated by the hydraulic system of the grader and is controlled from the cab.

Plows slice through deep snow with a minimum of resistance. The heavy weight and powerful tandem drive of Galion Graders combined with Galion Snow Plows enable you to clear maximum mileage of roads per hour of operation. Made in sizes to fit every model grader in the Galion line.

The Galion Snow Wing facilitates removal of snow from road shoulders, and is a great help in cutting down high drifts. The hydraulic pump (driven by grader engine) is used to insure quick and accurate adjustment of Wing and "V" Plow independent of grader operation. The Galion Wing has a four-foot lift adjustment from ground level and an angle adjustment of approximately 45° providing an 8 ft. cutting height. When not in use, Wing folds back close to grader.



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Cheap Bid Prices

Recently one of our state highway departments announced in a news release that it was giving the public a bargain in highway work, with contract award prices running a very substantial percentage under the engineers' estimates.

This spotlights the fact that highway contractors all across the country have bid far below the engineer's estimate on many jobs—the low bids averaged 11 percent under for all federal-aid work except secondary during the 1960 first half, the BPR tells us. The figures ranged as much as 19 to 22 percent under in a half-dozen states, and for certain categories of job sizes, the under-bidding was even more extreme.

This under-bidding raises questions of serious import:

1. How did the state highway department estimators get caught so far off base?
2. If the estimates were founded on actual cost computations—as they should have been—then how could the contractors suddenly afford to under-cut so drastically—and still hope to remain solvent, when labor and material prices are edging upward?
3. If as is probably the case the contractors frequently have taken jobs without a fair profit, or even at a loss, what is the highway industry coming to?

Contractors in highway work indeed have been finding the going rough, as was spotlighted by *Wall Street Journal* in a recent front-page article. The state cited above is among those that suffered a sharp cutback in road jobs under the federal contract control edict. It fortunately will enjoy a snapback under the federal fund releases made since midsummer. Now the question is, with more jobs to go around, will the contractors take better care of themselves in their bidding? At the AGC mid-year board meeting in Phoenix last month, it was pointed out that more volume doesn't necessarily mean more profitable contracting.

The financial health of the highway industry is a matter that concerns the long-range highway program to its very roots. Road construction is a highly mechanized art, requiring large investments in equipment. This equipment must be the most efficient obtainable, if the American public is to have its Interstate network completed and other billions of dollars' worth of new or modernized roads at lowest cost. Con-

tractors who bid profitlessly cannot keep equipped for top efficiency. It's a vicious circle, and one which of course can spiral many firms down and out.

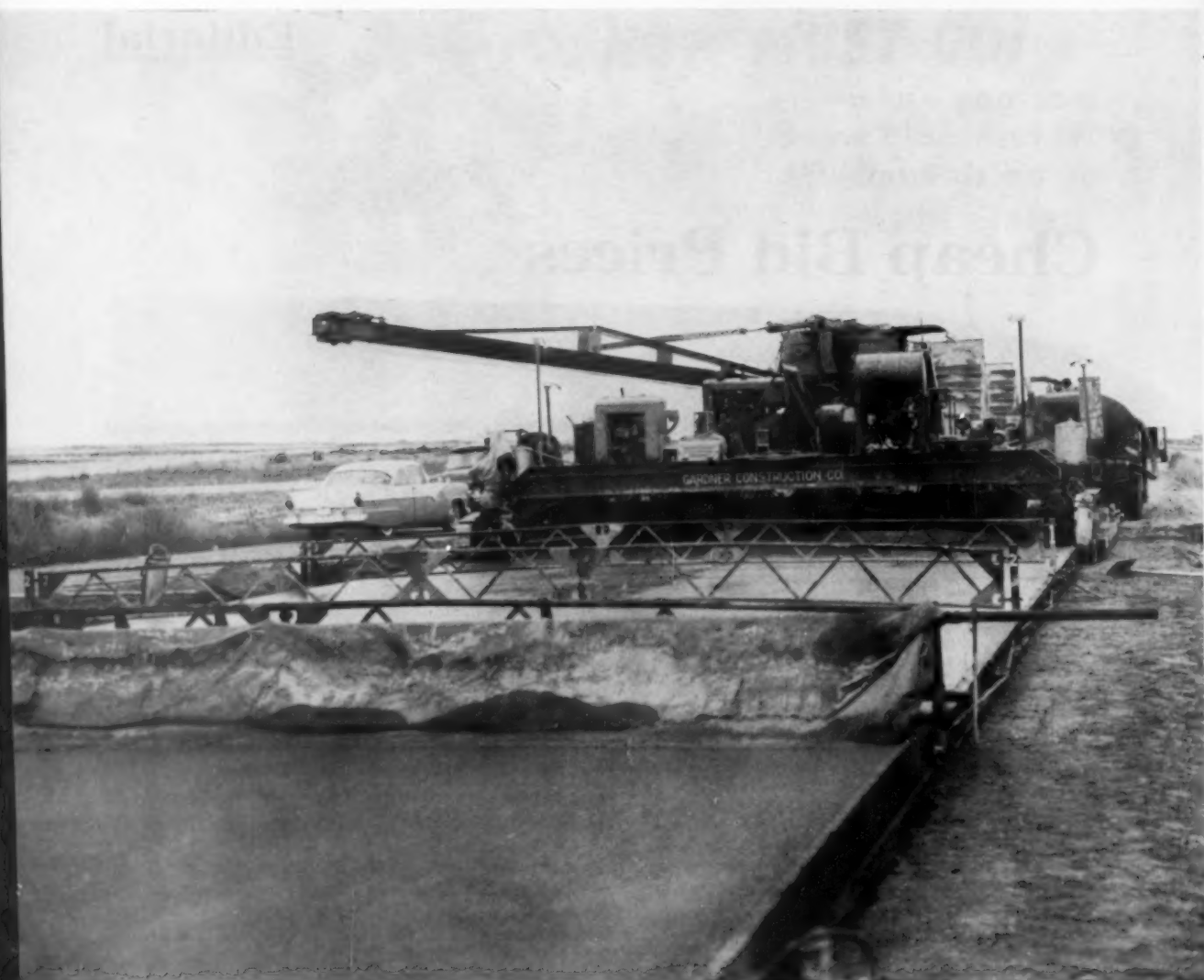
What's the answer? There is no simple one. Every large industry has gotten into periods of cut-throat competition, precipitated by business ups and downs. Look at the radio or TV set business, or autos. Free enterprise implies free competition, and highway building has been done, by and large, under the most completely open competition imaginable.

We've heard everyone blamed at one time or another for profitless bidding situations. Some blame bonding houses. Others, dealers or manufacturers who extend too liberal credit. At Phoenix, the AGC leaders noted that the expanded highway program was over-publicized at the start, leading to industry over-expansion. At that time Congress demanded proof that the industry had the capacity to complete the Interstate System in 13 years. The road builders were given what amounted to a mandate to get ready, which they did. Then, once the contractors got rolling, federal financing deficiencies forced a cut back. The recent contract controls further threw the flow of jobs off of an even keel.

Roads and Streets in its service to the highway industry has had only one contribution to offer with respect to the present conditions. That is to spotlight constantly the need for contractors to *know their costs better*, and to prepare estimates that are real estimates, rather than bid blindly. Our series of discussions on cost keeping will continue, as well as articles that will help toward better selection and utilization of equipment.

One last comment. We've seen more than the usual amount of old equipment out on jobs during the past season. Many contractors have held off buying new equipment. Now that highway awards have suddenly risen again in many states (Roads and Streets, October), factory and dealer people see considerable new business ahead. Many contractors will re-equip in 1961, but *they still must know their costs*. If 1961 brings no better profits, the contractors who bid too low will in most situations have only themselves to blame.

Harold J. McKeever



↑ In the wake of the slip-form machine, showing how unsupported slab edge "stands up", awaiting final touching up with edging tool.

Here is Gardner Construction Company's Koehring 34-E 3A tri-batch, feeding the grade ahead of the Rex slip-form paver.

Triple-Batch Paver Teamed With Slip-Form

Simple outfit with small crew made good daily footages on Colorado Interstate highway project

By H. K. Glidden
Contributing Editor

This report deals with the manner in which the Gardner Construction Co., Littleton, Colorado, combined a Koehring 34-E 3A Tribatch mixer, a Rex slip-form paver, and Maginniss high-frequency vibrators to produce a surface smoothness and pavement edge accuracy which the Colorado engineers considered outstanding.

Gardner Construction Company's \$2,091,000 paving contract is the third largest (money wise) ever awarded by the Colorado department of highways. The job consists of 15 miles of dual lane paving on Interstate 25 (paralleling US 87) on a segment north of Denver. Paving work began midsummer 1960.

The project reflects the continued approval of the slip-form paving method in Colorado, where the state highway engineers, under their end-result methods were among the first to provide contractors with an opportunity to try out the method.

One of the problems of slip-form paving has been that of working with low-slump concrete. The pavement edges must stand plumb and straight, unsupported by forms after the passing of the slip-form paver. This allows about five minutes for the consolidated concrete to emerge from the sliding forms with literally no slump. A companion requirement is that of keeping within pavement smoothness tolerances.

The pavement on the I-25 project consists of two 24-ft. lanes of portland cement concrete, 8 in. thick, non-reinforced.

William Hasse, general superintendent, stated that in his experience there are three important factors in securing efficient production and good pavement smoothness with a slip-form paver. The first is a uniform trackline grade. Secondly, the consistency of the concrete must be sufficiently uniform to avoid bumps

and finishing problems. The third item is that of a continuous operation. While short stops caused small bumps which were easily taken out by the finishers, longer interruptions in paving with this paving method have tended to leave greater pavement roughness. Non-stop operation hence has been the goal.

Finegrading. There were eight distinct steps in the preparation of the base course and subgrade.

1. The engineers set line and grade on 25-ft. stations, stakes on both sides.

2. The contractor used a motor grader and pneumatic rollers to obtain approximate finegrade and density.

3. Next was to set a stringline over the blue tops on each side of the pavement.

4. Then came a recheck of the rough base elevation from the stringline grade, and hand work to minimize the amount of work necessary by the finegrader.

5. The finegrader performed the fifth operation, working with two pneumatic rollers in the final grade.

The Rex track-type subgrade planer was pulled by a motor grader and front end loader in tandem. This scheme gave accurate steering with least strain on the finegrader frame, compared with towing by a single crawler tractor. The finegrader was picked up and moved when necessary by a front loader using a cable sling.

6. The sixth step was to recheck the trackline for grade. The engineers set new blue tops where they found deviations due to construction operations.

7. Just ahead of the mixer, a man hand-graded to blue top elevations for final subgrade accuracy.

8. The eighth and last step ahead of the paver was to wet the grade, done by a man who also kept tally on the batch trucks.



Close-up of Maginniss high frequency vibrators installed on the slip-form paver. Note the low slump concrete handled.



Concut Jointmaster used for rail-mounted saws for transverse joints, plus trailing centerline saw on the same rig.

Batching was done with a Johnson one-stop, fully automatic, electronically controlled plant operated by one man. A Koehring 545 heavy-duty sprawler equipped with a 2 yd. Johnson clamshell bucket loaded the batching bins. Compressed air for the batching operations was furnished by a Gardner-Denver ADR compressor.

Dry batch hauling was done by International R-190 and Ford-T750 trucks with Anthony 5- batch bodies. These trucks also aided a fleet of International 220s with 25-ton Lufkin trailer dump bodies in transporting and stockpiling aggregate. A Michigan 280 dozer pushed stone and sand to the loading crane.

Paving Operations. The job marked the first appearance of the new Koehring 34-E 3A triple-drum

mixer in Colorado. In commenting on this paver, superintendent Hasse said that it was theoretically possible to place about 230 ft. of 8" x 24' slab per hour under the Colorado specifications, but that his crew had not quite reached this theoretical maximum. While the cycling mechanism was set on 30 seconds, the paver was actually cycling on about 32.5 seconds. Hasse also said that the seven clocks, three of which are visible, together with the micro switches and electronic devices, made it impossible to beat the mixing cycle with the triple-drum paver. When the operator pushed the button to raise the skip, a chain of operations was started over which he no longer had any control.

The contractor had experienced no trouble in cleaning the interior in the triple drum.

Continued on page 72

Profit Squeeze On AGC Leaders' Minds at Phoenix

AGC Board Meeting topics also included subcontracting limitations, BPR's inspection, and the road program outlook

By Harold J. McKeever,
Editor-in-Chief

Profit worries were much on the minds of the six hundred contractor leaders who met at Phoenix, October 2-5, for the Associated General Contractors of America's annual meeting of governing and advisory board people. In nearly every session and particularly at the Highway Session, this worry kept popping up, even when not on the agenda.

Profitless bidding among general contractors was dubbed the industry's Number One problem throughout the nation by AGC president John A. Volpe, who tossed the matter into the delegates' laps during the opening general session. Using careful phraseology Volpe noted the "tendency of contractors to fail to realize that you don't stay in business without a profit." He credited profitless bidding in an effort to keep organizations going as a principal factor in more than one-half of the 670 drop-outs reported among the 7,000 member companies in the AGC family of 125 chapters.

"Many of these firms didn't take work at a price that would permit sufficient profit," were Volpe's words.

In a later session the AGC leaders were urged to campaign among member companies to recruit non-member firms. Companies that operate outside of AGC's constructive policies of dealings with labor un-

ions, and of handling work-quality and other policy matters, are potentially a detriment to the industry, the delegates were told. AGC has done much for the construction industry and for the public interest by being strong at both the national and state levels. Contractors today need to maintain a strong unified front in campaigning for the conditions necessary for industry health.

Coming back to the topic of profitless business, president Volpe said, "I'm not suggesting that we try to legislate higher prices, but that we must try to restore a healthy competitive state. We owe it to ourselves and our fellow contractors to pinpoint this situation."

Continuing to hammer away at this problem Volpe said, "Better to do one quality job at a profit than to do six jobs poorly and wind up merely exchanging your money for the other fellow's."

Volpe stressed the necessity today of keeping accurate cost records and making sound estimates.

1960 A Big Year, But—

The general business outlook for construction contractors came in for review at the general session. Managing director James D. Marshall reported on a survey of AGC chapters which shows that 1960 will see \$56.1 billion in total construction, or only 3 percent under the all-time-

record volume of 1959. This figure covers considerable spottiness locally, however. Questionnaire replies tallied 177 seeing a normal overall outlook, 157 above normal, and 81 below normal.

Tallies for highway work outlook only were 56 normal, 49 above and 33 below normal volume for the period ahead.

This questionnaire brought many comments on the business situation, particularly on the severity of the price battle. The composite opinion is that the condition is due to the cut-back in highway and certain other types of work combined with too much contractor work capacity.

The excess contractor capacity, particularly among road builders, was credited informally by AGC spokesmen at Phoenix as stemming from the over-publicizing of the expanded highway program beginning in 1955, combined with the failure of Congress to keep that program on schedule or to provide financing that would permit an even year-to-year flow of jobs. The contract controls put into force last year as a means of holding back under the Highway Trust Fund limitations, also accentuated the ups and downs of contract work in individual states.

Marshall noted that in the past few years contractor profits in gen-

Continued on page 80

Trucking Freeway Dirt Was an Obstacle Race

By James R. Cummings

Associate Editor

With a large part of Chicago's South Expressway entering the earthmoving stage, a number of contractors put their excavation, hauling and embankment work into high gear during the 1960 summer. Using primarily late-model equipment, Rossi Trucking Company was able to move considerable yardage despite some of the usual difficulties—a rainy spring, traffic problems—plus a vexation all its own: a prickly fill area which caused 20 to 30 flats a day for a time.

After dropping directly south of the Loop for ten miles, the South Expressway divides. The west leg will connect with the Tri-State Tollway around the city and is projected to continue southwest through Cook County to an Interstate route through southern Illinois. The east leg curves east for a mile then south to a merging with the Calumet Expressway. The Rossi company has a contract to build half of the embankment on this southerly curve where the east leg passes over 103rd Street.

Considerable embankment work is involved in this east leg, with the expressway rising from a depressed right-of-way to pass over several railroads and major traffic arteries. These earthwork contracts also included excavation for the depressed section of the expressway to the north, with each contractor using the excavated material as fill for his embankment work on the east leg.

Rossi has a contract with Cook County for \$844,333 which, among the items, was for removing 600,000 cu. yd. from a mile-long expressway section and using this material to

build and grade the embankment at 103rd Street. The company began operations in April and planned on a six-month completion date but immediately ran into bad weather. May and June were exceptionally wet in the Chicago area. In June, for example, the actual amount of rainfall was not excessive, but the days on which measurable rain fell were double the usual number, and it was these frustrating showers that brought the dirt work to a halt so frequently.

To bring the right-of-way down to grade, Rossi used three Northwest cranes (two 80-D, one Model 6) with 2½-yd. dragline buckets. On a typical mid-season day these units loaded to a fleet of 28 haulers—Mack trucks with Fruehauf dumping trailers. Most of the trucks on these 10-wheel, 21-yd rigs were late-model Mack B-61s.

Depression of the roadway is 15 ft. at bridges carrying cross streets, rising to 5 ft. below surface street level, between structures, with a profile grade of about 1 ft. per 100 lin. ft.

A Caterpillar 12 motor grader and Cat 977 Traxcavator were employed to keep truck loading areas clean and firm.

As with any urban cut-and-fill project, the hauling was found to be a major factor in the Rossi job, especially so, in this case, because the most direct route to the fill area was State Street, an important traffic carrier. The morning rush hour traffic was not an extreme obstacle since, being generally Loop-bound, it was headed north and opposite to the loaded trucks. The afternoon rush would have

been a different story, so the Rossi work-day was set at 6:30 a.m. to 3 p.m. to escape the late afternoon traffic.

The round-trip haul was 6 miles, and the cycle was found to average about 30 minutes. On one day observed, 21 Rossi trucks were in use and the tally man was checking them in every two minutes. Quantity moved was 3,000 yd. during the 8-hour day. Careful loading was enforced both to minimize spillage and to keep the gross load to the 72,000-lb. maximum permitted by the truck plates.

The material being excavated was mostly clay, with small amounts of sand. The four types of clay involved had an average Proctor density of 110.6 lb. per cu. ft. and optimum moisture content of 17.6 percent under the standard ASTM T-99 method of test.

The embankment varied in height from 2 to 37 ft. The material brought in was spread in lifts of 6 in. The compaction sequence involved tandem LeTourneau-Westinghouse sheepsfoot rollers with Rome discs, pulled by a Caterpillar D8 tractor, and followed by a Bros 50-ton rubber-tired compactor.

The cause of Rossi's tire troubles on this job goes back 30 years. The site of this embankment had been used as a garbage dump by the city of Chicago until 1930. And when the contractor started probing for stable subgrade he began turning up ashes, bottles, cans and bedsprings. As a result, he had to go as deep as 16 ft. in many places; and the total excavation in this area ran to 200,000 cu. yd.



Three Rossi Trucking Company draglines working on the depressed right-of-way of the new South Expressway in Chicago. Trucks used State Street (left) on trip to fill area.



Two loaded Rossi trucks, at right, pass one returning to the loading area. This squeeze was just one more situation demanding complete attention on this busy thoroughfare.



Sheepsfoot compaction, with Rome discs. Usually rollers were used in tandem to battle the heavy clay.

It was this phase of the haul cycle that brought the flat tires: crossing a reclaimed garbage dump to reach the fill site.



Draglines were found effective for truck loading on this project involving Chicago's stiff blue clay.



However the trucks bringing in fill material continued to run across nails, broken glass and miscellaneous shards of metal. And the company averaged close to 30 flat tires a day.

This condition had several painful results. "We had to keep 27 to 28 trucks on the job to get 26 running," said Joseph Rossi, one of the owners, "because there were one or two down continuously, nearly all due to flats."

Also a job factor was the continuing loss of service of these trucks. Even with the faster tire replacement at the nearby field shop, it was found that a truck was out of service for at least the equivalent time of one run. Thus the company was losing 25 to 30 truckloads a day due solely to flat tires.

And then there was the direct expense of tire repairs. Even though using Firestone's sturdy 10.00-20, 14-ply tires, the flats came into the field shop so fast that the company had to contract with a local tire shop to get the tires back into service as quickly as possible.

The tire shop made two pick-ups and deliveries daily during this trouble. Tubes were repaired and boots put in the tires. The tires were not vulcanized because this would keep them out of service too long. Rossi used tires containing as many as ten boots and was able to stretch tire mileage in these forbidding conditions—eventually, he hoped, to 25,000 miles per tire.

The trucks were refueled each morning, and received a complete oil change every 2,000 or 3,000 miles. The field shop was a Butler steel building erected on leased land near the excavation area. Servicing of trucks and minor repairs were done here; units requiring major overhaul were sent back to the company's headquarters on Chicago's southwest side. The stock of parts and service supplies at the field shop included a Quincy compressor with Wisconsin 2-hp motor, a Miller welding outfit, also oil filters, wheel seals, rims, batteries, headlamps, drums of diesel fuel oil, gear and track roller lubricant and machine oil, coils of Roebling 1-in. wire rope.

Partners of Rossi Trucking Company are Joseph and Angelo Rossi. Dave Luciani was job superintendent on the South Expressway.

Northwest 80-D dragline loading one of the hauling fleet. To guard against spill, the operator would frequently tamp down the dirt with his bucket.



The 2½-yd. dragline bucket worked easily in this stiff clay.



A stake truck belonging to Hazelcrest Tire and Supply Company on one of its twice-daily deliveries of repaired tires at the Rossi field shop.

Why all three models of Cat Tractor-Scrapers in our fleet?



Gordon Ball, President, Gordon H. Ball, Inc., Danville, California

"It's simple. We've learned that we get the highest, most economical production with machines that are matched to the job. Each job we do is different—and conditions vary on each job. The most important common factor is the need for high production at lowest cost.

"No one machine can do everything best. Some can handle grades better. Some can haul bigger loads faster. Others can work in tighter quarters. So we want the machines that best fit the jobs. This gets us to Cat Tractor-Scrapers. Each one—DW21, DW20, 619—gives us high production under a broad range of applications. And each does it *economically*. But each can handle certain conditions better than the others. With only one model, we would have to live with conditions that limit the machine's effectiveness on parts of the job to get best over-all production. With all three models, we can use the one that works best on each phase of the project, for highest total production at lowest cost.

"What are these conditions? Take bad grades or soft underfooting. Our versatile DW21s handle these with comparative ease. When we can take advantage of their high speed on long hauls, we use our high production DW20s. And when we have to work in tight quarters where maneuverability is essential, we bring in our smaller 619s. This doesn't mean any of them sit idle when these conditions don't exist. We simply take

care of the special conditions with the best suited machines, and put the rest to work on other jobs.

"Take a look at typical assignments. The DW20s and DW21s are working on highway projects. Hauls up to two miles permit efficient use of the high travel speeds of the four-wheel DW20s. Steep grades, particularly around Conway Summit, are best handled by the two-wheel DW21s. The 619s easily handle dirt-work in the deep narrow channels of the San Lorenzo Creek Flood Control Project.

"Of course, a major consideration is their ability to do this month in and month out, with little lost time for maintenance. They must be, and are, ready to work when we need them, and able to stay on the job until the work is done. This combination of high production, ability to handle any job and low maintenance helps us move our dirt fast at the lowest possible cost."

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DW21 Series G

High producer on bad grades
and in soft going

345 HP (Maximum Output)

22.6 MPH

Optional SynchroTouch Trans-
mission Control—split-second
shifting with the efficiency of
direct drive

Matching 470B Scraper—
19.5 cu. yd. struck
27 cu. yd. heaped



DW20 Series G

High producer on long hauls

345 HP (Maximum Output)

35.8 MPH

Optional SynchroTouch Trans-
mission Control

Choice of Scrapers:

456B—19.5 cu. yd. struck

27 cu. yd. heaped

482B—24 cu. yd. struck

34 cu. yd. heaped



619 Series B

High producer in tight
quarters

225 HP (Maximum Output)

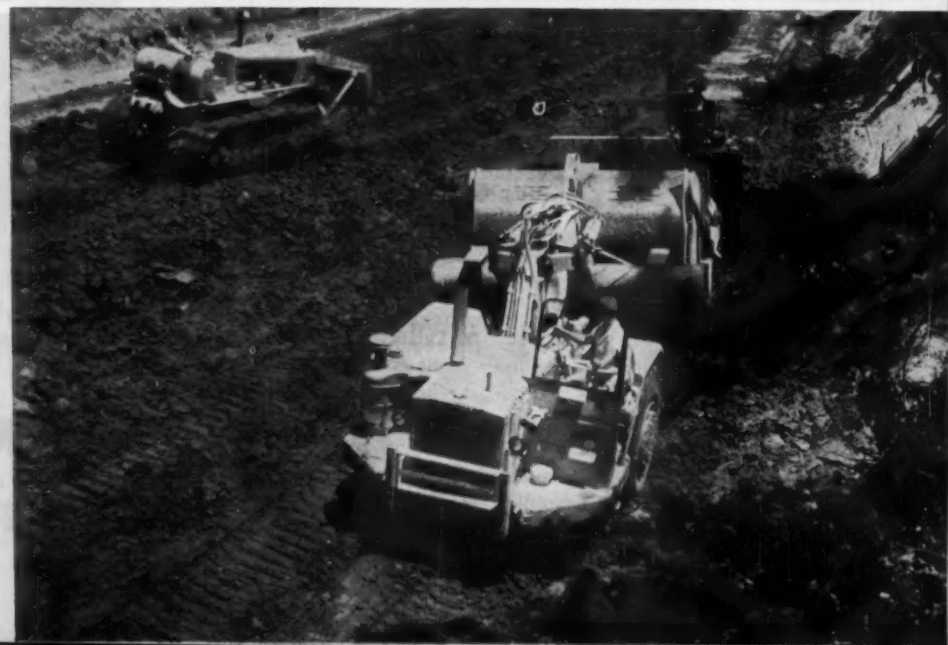
30.2 MPH

30-ft. turning diameter

Matching 442B Scraper

14 cu. yd. struck

18 cu. yd. heaped





HOUSTON SHELL & CONCRETE hauls heavy loads of ready-mix concrete the economical way—with a fleet of Macks. This B-60, on duty at the Port of Houston, prepares to pour concrete into bucket, which will then be lowered into construction site by dragline.



To meet precise pouring schedules,

Houston Shell & Concrete relies on MACKS

In the Houston industrial and seaport area, Houston Shell & Concrete handles both large and small ready-mix concrete deliveries to widely scattered job sites. To do this most efficiently—to get the loads in and the trucks out on schedule—the company relies on Macks.

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how sticky the terrain, Mack Balanced Bogies with Power Dividers have produced the sure-footed traction that keeps trucks moving.

This is the kind of performance you can count on from Macks. There's a Mack to haul your load more economically and more efficiently. With the trend toward maximum efficiency from every piece of hauling equipment, can you afford to be without Macks? For more evidence of their on-the-job superiority, call your Mack

branch or distributor. He'll be glad to give you the names of satisfied users in your area. They'll tell you about Macks. Mack Trucks, Inc., Plainfield, New Jersey. Mack Trucks of Canada, Ltd., Toronto, Ontario.

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This 20 ton UNIT Model 1520T truck crane is setting steel for a power line atop Mt. Frances in Utah.

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UNIT TRUCK CRANES are easy to operate and maintain. The roomy, Full Vision cab gives you an unrestricted, 360° view; has ample head room and large, super-safe, heat tempered glass windows. Sliding side panels and wide hood covers give spacious access to the crane motor and clutches.

UNIT TRUCK CRANES are built in five size ranges — 10, 15, 20, 30, and 35-40 tons — to handle most any lift job. Convertibility to all excavator applications brings you a plus value. Your UNIT dealer has full information on every model — and the famous UNIT crawler-mounted machines, too. Call him soon.

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ROADS AND STREETS, November, 1960



Contractor Blasts "In-Place" Through Home Area

When a large road building contract calls for blasting a deep cut right through a city's residential area, what precautions are necessary to prevent personal injuries and property damage—and hostility from the townspeople?

This problem faced J. H. Beers, Inc., holder of a \$3 million contract for 2.6 miles of the Stroudsburg (Pa.), Bypass, U.S. Route 611, a link in the Interstate highway system. The contract takes in grading and paving of 14,591 lin. ft. of right-of-way. The highway will have concrete pavements 24 ft. wide separated by a divider.

Most of the contract involves only normal excavation and grading work. At one point, however, a rocky hillside obstructs the contractor's path. Here, a cut 2,500 ft. long and 85 ft. deep is being blasted out. More than 351,000 cu. yd. of material will eventually be removed, about 280,000 cu. yd. of it rock.

Here is where the problem arose. This hillside is in a residential section of Stroudsburg. It's dotted with homes owned by influential and vocal group in the community. Some of these homes are less than 100 ft. away from the blasting site. Situations like this demand careful preliminary studies of the possible effects of blasting—and the use of the latest techniques of scientific, controlled blasting.

Because controlled, "in-place" blasting—essential on jobs like this is highly specialized, Beers' construction superintendent, W. C. Henderson, requested technical assistance from Atlas Powder Company in planning the blasts.

First, vibration measurements of test shots were made to determine the maximum amount of explosive that could be used without damaging nearby homes. This was done by Vibration Engineering Company, Hazleton, Pa., using three-



Blasting a cut through the middle of Stroudsburg has taken careful planning. Carefully controlled shooting has brought praise from the local press and residents.



Blast loaded and ready to shoot—go holes, 9 ft. deep on 6 ft. spacing and 7 ft. burden.



Rockmaster millisecond delay action starts at far row, far end proceeding progressively in each of five rows of holes.



At $2/3$ sec., blast has almost run its course. Rock throw is held down with 6 ft. of sand stemming.



Humping of muck pile shows good displacement even though rock has been virtually blasted "in place."



Some of J. H. Beers' equipment at Stroudsburg, working under the shadow of homes (immediately back of the camera). Hole depths were restricted due to this situation, and other precautions taken which are destined to be used with growing frequency as the highway program advances in built-up areas. (Roads and Streets staff photo)

The New 38-Delay Cap Series

Averaged elapsed time of each delay starting from zero or instantaneous

Delay No.	Milliseconds	Delay No.	Milliseconds
0 (zero)	0 (inst.)	19	875
1	8	20	1000
2	25	21	1125
3	50	22	1250
4	75	23	1375
5	100	24	1500
6	125	25	1625
7	150	26	1750
8	175	27	1875
9	200	28	2000
10	250	29	2125
11	300	30	2250
12	350	31	2375
13	400	32	2500
14	450	33	2625
15	500	34	2750
16	550	35	2875
17	600	36	3000
18	750	37	3125
		38	3250

dimensional seismographic equipment.

Next, the actual shots were planned to take advantage of a favorable geological condition. The mountainside is composed mainly of seamy, pocketed, dolomite rock which pitches south about 12-15 degrees. Since the nearest homes are south of the cut, the rock strata slip away from them. Consequently, the blasts are initially detonated as far from the homes as possible on the sloping side of the mountain. This first weakens the rock at the slope and, as detonation progresses through the rock in the direction of the homes, the force of the blast is directed more in an opposite direction—toward the weakened rock.

With precise control of detonation sequence essential, Rockmaster milli-second delay electric blasting caps are used to set off the explosive charge in each hole. With these caps, any detonation pattern can be worked out in advance. This provides needed flexibility in close quarters.

Beers is able to blast "in-place"—that is, without scattering or excessive rock throw. A heaving, breaking action is obtained by drilling the holes close together and increasing the stemming in each hole. The holes, which are 3½ in. diameter, are usually drilled on 6-ft. spacing and 7-ft. burdens. Depth of the holes averages 12 ft., or somewhat less than would be most economical for the large shovel used.

The main charge in each hole is Granite pre-mixed ammonium nitrate which is primed with a single 2 x 16 in. stick of 40 percent Giant gelatin. The average shot involves about 900 to 1,100 cu. yd. of material using about 800 lb. of ammonium nitrate. The powder factor is about .82 lb. per cu. yd.

The charge is initiated at the bottom of each hole. This produces the required heaving action and promotes effective breakage. The combination of millisecond delay detonation and a low powder factor has kept most vertical movement of the blasts to within 15 ft. Only on one occasion so far has a weak spot resulted in any excessive throw.

One of the major reasons why Beers has kept production sched-

Continued on page 77

Many Revisions in Manual On Traffic Control Devices

The bible of traffic engineers in pavement marking, signalization and related matters has been undergoing revision. What the new edition will contain, awaited with keen anticipation by traffic and highway design engineers, was revealed in considerable detail at the convention of the Institute of Traffic Engineers, Chicago, September 10-15.

The "Manual on Uniform Traffic Control Devices" in fact was given an entire session at the Chicago meeting. Some of the session's highlights are covered in the following notes.

The importance of gradually achieving greater uniformity in traffic control was well expressed by

Charles W. Prisk in his introduction of panel speakers. Prisk who is a past-president of the I.T.E. and the traffic safety top-man in the Bureau of Public Roads, Washington, observed that since we cannot make people uniform we must strive to make as uniform as possible the environment under which they drive.

Moderator of the panel was Wilbur S. Smith, of the traffic consultant firm bearing his name. Smith noted that the revisions in the manual have been accomplished in a short time, despite the necessity of giving all agencies opportunity to review suggested changes through committee channels and give formal concurrence.

The changes cover signs, mark-

ings, signals and also include new data on sign standards construction of signs, traffic control devices, and references to traffic control devices as they relate particularly to civil defense. If a leading characteristic of the revised manual were to be chosen, Smith said, it would be this wherever possible, alternates have been eliminated, as they in themselves lead from uniformity.

George M. Webb, traffic engineer, California division of highways, reported on the highlights of changes in the section of the manual on markings. These fall generally into three categories:

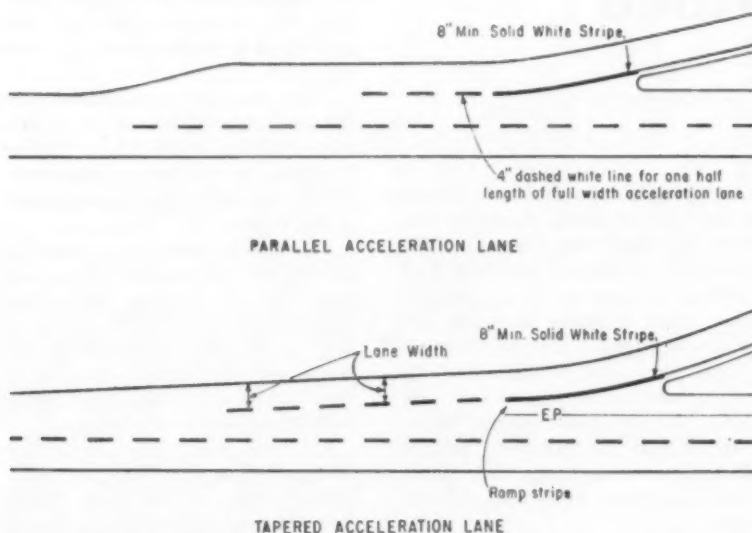
(1) The new manual improves and extends the application of pavement and hazard markings.

(2) It standardizes markings by elimination of some previously permissible alternates.

(3) It provides new tools for the traffic engineer in the field of traffic markings.

Centerlining: The manual now recommends a centerline stripe on all paved highways and reduces traffic warrants for the application of a centerline. Another significant change is the requirement that all pavement markings having use at night be reflectorized. Because of the reduced height of modern cars and the high percentage of small cars, sight distance on vertical curves has been reduced from $4\frac{1}{2}$ ft. to 4 ft. above the pavement in the establishment of no-passing zones. In this section, the 85 percentile speed has been substituted for the previous design speed. The length of tapered barrier line at pavement width transitions or at the approaches to an obstruction in the roadway will be determined

Continued on page 63



Geometrics of marking which the revised manual has adopted for highway entrance ramps. Ramp stripe in lower view is on an extension of the ramp's left edge. The solid line must be carried to within 6 in. of the edge of the through lane, or to the end of the ramp curve if closer. Dashed line should continue to the edge of the through lane. (Figure 2-6 in Manual)



Invert plates were placed first, then bottom corners, side plates, and top plates.

Giant Culvert Takes Local Traffic Under "I" Road

An economical underpass design was put into service recently east of Valley City, North Dakota, where new Interstate Route 1 intersects a small local road.

Traffic volume here did not justify building an expensive underpass. But in North Dakota, as in most states, it is not possible to dead-end an existing road without considering the availability of an alternate route crossing the new highway. Since there was no other underpass nearby, the highway department's problem was to plan one that would meet the load, safety, and clearance requirements at the lowest possible cost.

Armco engineers, working with

the highway department, developed a corrugated metal structure that met all these requirements. The structure consists of standard Multi-Plate sections with top and bottom plates of 3-gage steel and side plates of 1-gage. The heavier side plates were used to withstand the anticipated active lateral soil pressures during construction before the fill was completed. Similar structures using 5-gage side plates have since been built with no difficulty.

The underpass is 194 ft. long with a horizontal span of 16' 5 1/2" and a vertical rise of 14' 2 3/4". Ends are step-beveled to a 2:1 slope.

Computations of the expected

soil pressures resulting from back-fill indicated that the foundation soil would have to support a load of 3,100 lb. per sq. ft. The existing soil was excavated for the full length and width of the underpass and replaced with a sand and gravel soil. The material was compacted to meet a 4,000 lb. per sq. ft. loading.

The structure foundation area was graded to a 6-in. slope to provide drainage, with a 3-in. camber to allow for the greater settlement under the higher fill in the middle of the pipe.

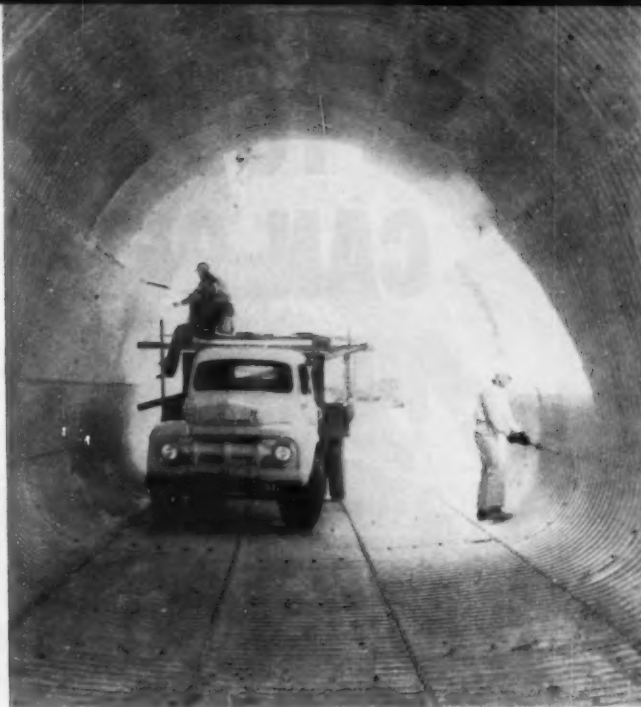
The invert plates were installed first for the full length of the underpass. Bottom corners, side plates and top plates followed in that order. A traveling crane lifted and positioned the plates while workmen bolted them together from a scaffold mounted on a truck.

All bolts were tightened with a pneumatic impact wrench to a minimum torque of 175 ft.-lb. Every 20th bolt was checked with a torque wrench.

When the structure was completely assembled, plumb bobs were suspended by wires from the top every 25 ft. These were adjusted to



Individual plates were bolted together, forming a completed structure corresponding exactly with the designed shape.



within 4 in. of the invert so that as backfill progressed over the structure, engineers could check for deflection.

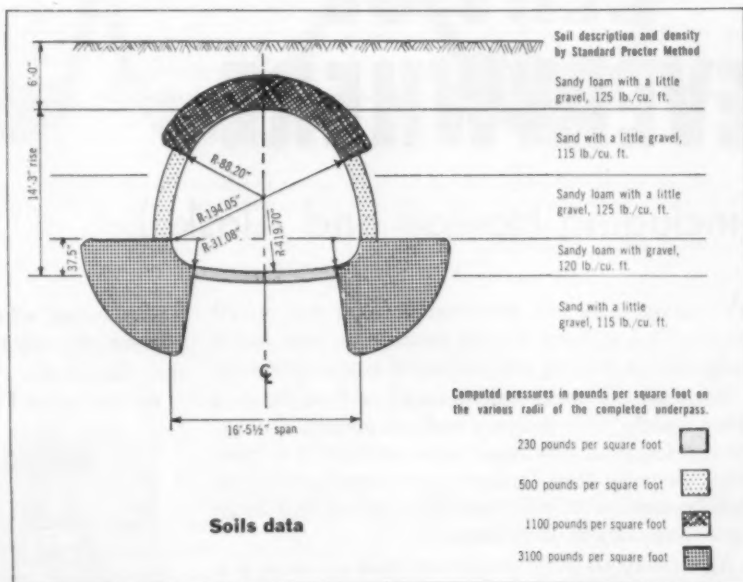
Various soils were brought in by scrapers, placed in 8 to 10 in. layers, and compacted with sheepfoot rollers. Pneumatic tampers were used in close to the structure as well as under the haunches. Then, backfill was carried to the grade level, 6 ft. above the structure and compacted in layers.

Wooden struts were placed inside until all backfill had been placed and compacted. However, this installation showed that strutting was not necessary, except at the ends.

Procedures followed in installing the structure pointed out the necessary factors that must be considered when installing any large-size flexible corrugated metal structure. These are:

1. The structure must be installed so that, when plates have been assembled and backfill completed, the structure will be as nearly as possible the shape in which it was designed and manufactured.

2. Backfill material around the structure must be compacted to a



Soils data which governed design and placement of the underpass structure near Valley City.

density equal to that of a good highway embankment, and should extend in all directions a sufficient distance to withstand loads transferred from the structure.

3. There must be sufficient cover on the structure to provide a vertical load to overcome the active side pressures from the embankment and live loads.

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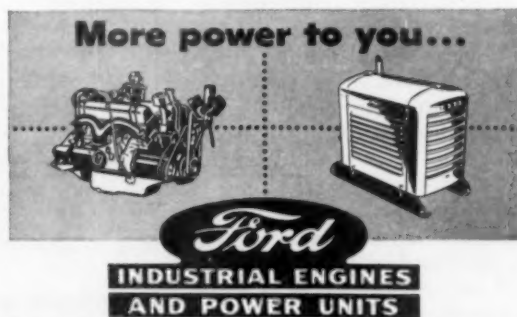
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by a formula based on speed and offset distances.

The most significant change in the markings section involves the elimination of a previously permissible alternate. This is the elimination of the double white barrier line which formerly existed as a permissible alternate to the double yellow barrier stripe. This will involve major changes in equipment and practices in a dozen states.

Sign Section: According to James E. P. Darrell, traffic engineer, Minnesota department of highways, the section on signs has been almost completely rewritten. It now also includes references to expressway signing, lane use, civil defense, and construction signing. In general, he said, the changes show increased emphasis on standards, again with a reduction of alternates. This includes elimination of qualifying statements which have heretofore added to the confusion; for example, failure to specify or approve a single standard.

Some of the changes:

Sign sizes have been increased in the new book. Small sizes are now permitted only for lesser-used 2-lane roads and those having 85-percentile speeds of 300 mph or less.

In a revised statement under standardization, replacement of non-standard signs is specified to be "as soon as is feasible". Sign sizes will now be designated "standard" rather than "minimum".

Other changes:

Increased recognition of the value of symbols, with encouragement of their use. The use of yellow flashers with regulatory signs.

Revision in warrants for stop signs.

Increase in size of "yield" signs from 30x30 to 36x36.

Approve alternate of "keep left to pass" to "slower traffic keep right".

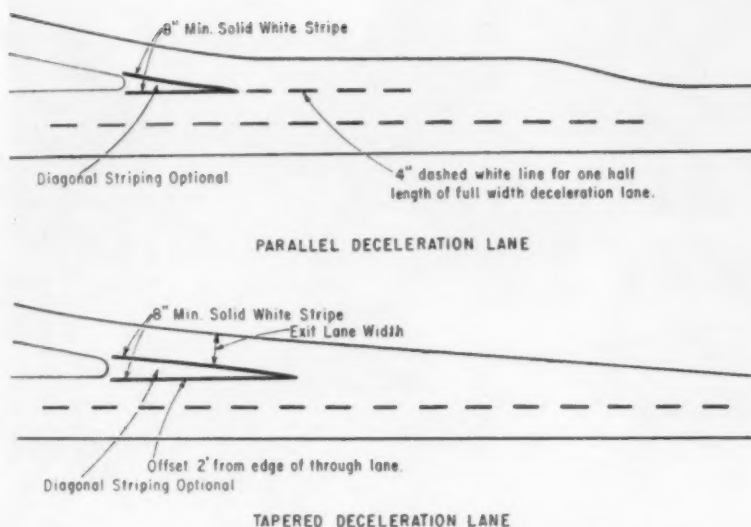
Signal Practice: The important changes in the section on traffic signals were itemized by George W. Howie, director, utilities and traffic, City of Cincinnati:

The meaning of arrows has been clarified.

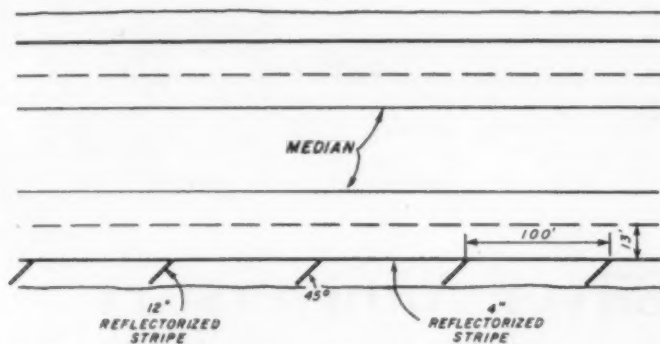
Location of traffic signal heads has been standardized.

"Pre-timed" is substituted for "fixed time", and the section on pre-timed signals has undergone considerable strengthening of warrants.

The definition of "traffic actuat-



Marking pattern adopted in revised manual for exit ramps. (Figure 2-6a)



Typical shoulder marking adopted for the new wide paved shoulders as found on Interstate freeways and other high type roads. Shoulders having same surface texture, riding quality and color as the traffic lanes can be conspicuously delineated by the reflectorized diagonal stripes indicated. (Figure 2-3 in Manual)

ed" signals has been clarified.

Portable traffic signals are not recognized as standard traffic control signals.

The display of yellow preceding green has been eliminated.

Provision is made for the display of green arrows alone.

Use of stop signs at signalized intersections is discontinued.

Signal faces must be located in such a position as to give drivers a clear and unmistakable view of their right-of-way assignments.

Howie said that the section on reversible-lane signal controls has been almost completely rewritten.

It was also worthy of note, he remarked, that this entire chapter on traffic signals, containing so many

revisions, is briefer than the one it supplants because of the deletion of much explanatory material.

Maryland to Make Mid-State Wide Sign Survey

A survey of existing road signs is being made by the State Roads Commission of Maryland. The survey is needed as a basis for modernizing signs and installing where necessary such new type signs as overhead bridge-mounted ones where justified.

Also it is expected that numerous poorly signed areas will be corrected.



The first scientifically controlled highway built of soil-cement. A section of South Carolina 41 near Johnsonville, as recently photographed. This road now carries 2,000 vehicles daily.

Silver Anniversary for Soil-Cement Roads

The twenty-fifth birthday of the first soil-cement road is being observed in South Carolina. In the fall of 1935, the first scientifically controlled road constructed of soil-cement was completed by this state's highway department.

Causing little public interest at the time, this pioneer 1½-mile project was a 'break-through' in highway construction technique demonstrating the durability of this type of road. Today, according to the Portland Cement Association, more than 24,000 miles of soil-cement paving is in service in the United States and Canada, plus millions of additional square yards in other parts of the world.

The pioneer South Carolina highway is in use, serving an increasing traffic load (now 2,000 vehicles daily). In the meantime, the

soil-cement base has gained strength according to Association engineers.

Soil-cement is a tightly compacted mixture of pulverized soil or road-way material, and precisely measured amounts of portland cement and water. As the cement hardens, the mixture becomes a strong, durable pavement base, generally built about 6 in. thick. To complete the pavement, a relatively thin asphalt wearing surface is placed on top.

One of the leading factors behind the growth of soil-cement for street and highway construction is the availability of materials at little or no cost. The soil used constitutes 85 to 90 percent of the finished pavement base. Generally, it is readily obtained either at the paving site, or from a nearby source, so that only the cement and water need be transported.

Today, soil-cement is extensively employed to pave not only light traffic roads, streets, airports and parking areas, but is also used for subbases beneath heavy-duty concrete pavements, and for shoulders on Interstate System highways. During 1959 about 46 million sq. yd. of soil-cement were put in place.

PCA engineers note that much systematic research went into the development of soil-cement. Among the state highway departments which pioneered in this venture were those of California, Iowa, Ohio, South Carolina, South Dakota and Texas. Their initial efforts date back to the 1920's. The science of mixing these two ingredients in exact proportion, and properly compacting them, was new, so that the results were seldom successful.

The year 1929 marked the first real step forward, with the discovery of what engineers call the 'moisture-density relationship' in soil compaction. Today the best amounts of cement and water can be readily determined for any soil after a simple laboratory analysis.

The second step forward was taken in 1932. The South Carolina state highway department initiated experiments including test sections. The promising results lead to an extensive research program by the department and the Portland Cement Association.

It was discovered that if the moisture-density tests were combined with durability tests, encompassing cycles of freezing and thawing and wetting and drying, that very predictable field results were possible.

The cumulative result of these laboratory tests was a joint venture undertaken by the South Carolina highway department, the Bureau of Public Roads and Portland Cement Association. The 1½-mile pioneer 'silver anniversary' road resulted.

Viewing the success of the South Carolina project, other states followed suit. Illinois, Michigan, Missouri and Wisconsin initiated their own experimental projects the following year, with additional soil-cement work also being instituted in South Carolina. Two years later, eight more states launched projects. Today, soil-cement is reported to be a major type of low-cost paving in all 50 states, and its world-wide use is paralleling the rapid growth in highway programs in all continents.



CUT RESURFACING PREPARATION COSTS **... renew bridge decks with latex modified mortar**

Here's how you can prepare and resurface structural concrete bridge decks in less time and at lower cost using portland cement mortar modified with Dow Latex 560.

Compare these savings. Conventional resurfacing methods require that you jackhammer out at least three to four inches of old concrete across the entire surface of the bridge and lay three to four inches of new concrete.

But when you're resurfacing with latex modified portland cement mortar, *only* the areas of actual failure need be jackhammered and sandblasted — and then only to a minimum depth of $\frac{1}{2}$ inch, or to a depth sufficient to expose a sound concrete base. This thin layer of latex modified portland cement mortar has greater adhesion to substrate and produces

a surface with greater flexural, tensile, compressive strength, greater resistance to water penetration, and higher freeze-thaw resistance than conventional concrete or asphalt resurfacing! It conforms to the expansion-contraction cycle of the original concrete, and reduces stress on the new surface.

Highway engineers, working with Dow research, have made field placements of latex modified mortar on bridges in Michigan, New York, Vermont, Texas, Ohio and several other states. For full information write for a technical report on how to apply latex modified portland cement mortar on structural concrete bridges and highways: THE DOW CHEMICAL COMPANY, Midland, Michigan, Plastics Sales Department 1958EK11.

See "The Dow Hour of Great Mysteries" on TV.

THE DOW CHEMICAL COMPANY • MIDLAND, MICHIGAN

ROADS AND STREETS, November, 1960

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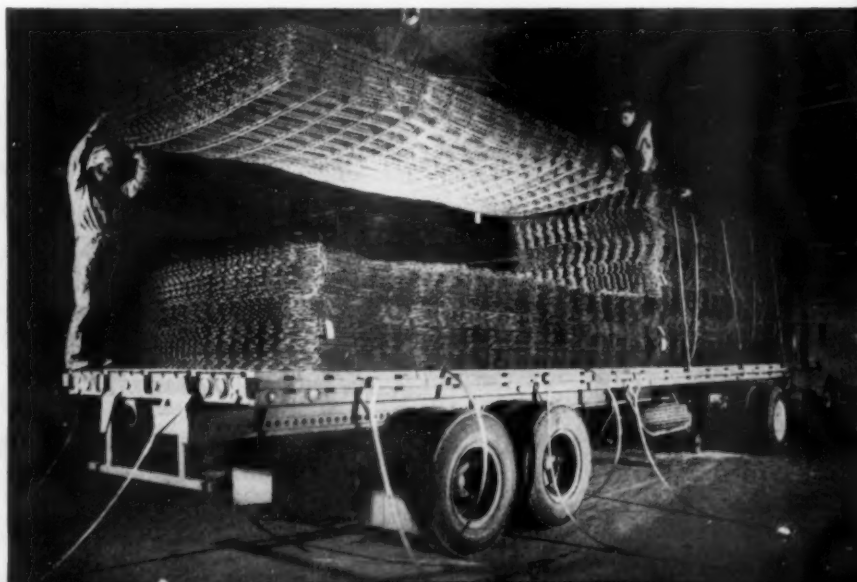
New Hinged Road Fabric from Pittsburgh Steel folds in slightly more than half the fabric's full width. Here in Glens Falls, N.Y., where Torrington Construction Co. of Connecticut is building a 14-mile strip of the \$275-million Northway, Job Superintendent Patrick J. DiNatale shows how new fabric folds along hinge running length of the sheet.



Pittsburgh Steel's New Hinged Road Fabric Big Success On New York State's Northway

Contractor Saves About One-Third Installation Time

Ready to go at Pittsburgh Steel's Monessen, Pa., plant is a flat-bed truck loaded with new Hinged Road Fabric. Ordinary road fabric requires special cradling equipment and extra handling. Not so with Pittsburgh Steel's new Hinged Road Fabric: it's shipped folded flat and in weights up to 40,000 pounds per truck (depending on size and style), twice that of ordinary fabric. Shipments to Glens Falls took only a day.



A revolutionary new road fabric from Pittsburgh Steel Company simplifies shipping, speeds handling and cuts installation time on roadbuilding jobs by as much as one third.

The new product, called Hinged Road Fabric, provides the steel backbone for a 14-mile strip of New York State's gigantic, \$275-million Northway linking Albany with Canada.

Hinged Road Fabric features an off-center hinge running lengthwise on each section. Roadbuilders using this product—one of several being introduced by Pittsburgh Steel—cite its built-in benefits during:

- **Shipping**—Because Hinged Road Fabric's novel hinge permits folding in slightly more than half the fabric's full width, it can be stacked easily within the eight-foot width limit of a truck bed or gondola. This makes special cradle trucks and cradling equipment unnecessary.

As a result, trucks can be loaded to capacity (subject to state weight restrictions)—up to twice the weight possible with ordinary fabric.

- **Handling**—A single section of Pittsburgh Steel Hinged Road Fabric can be handled easily by two men instead of the four usually required for unwieldy ordinary sheets.

- **Installing**—Because the sheet is not bent during shipping and stacking, new Hinged Road Fabric lies flat when installed.

At Glens Falls, N.Y., where 800 tons of Hinged Road Fabric were installed on the four-lane, 175-mile Northway, Torrington Construction Co.'s veteran roadbuilders added their stamp of approval.

Patrick J. DiNatale, the Connecticut firm's job superintendent, was especially enthusiastic about the one-day service on Hinged Road Fabric truck shipments from Pittsburgh Steel's Monessen, Pa., plant.

"We get terrific service from Pittsburgh Steel," said Mr. DiNatale. "It takes just one day for a shipment to get here."

"Ordinary fabric usually takes a week to ten days to arrive because it's handled by truck, rail and then truck again. That's because many counties and cities won't permit trucks with overhanging loads to pass through."

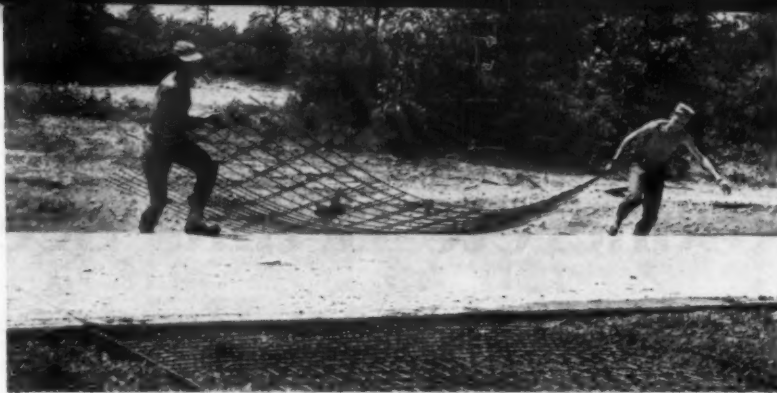
"Pittsburgh Steel's fabric is handled only once—and in one day in loads up to 40,000 pounds, not 20,000."

Torrington's field engineer, Robert B. Cunningham, is enthusiastic about Hinged Road Fabric's fast, easy handling. He said:

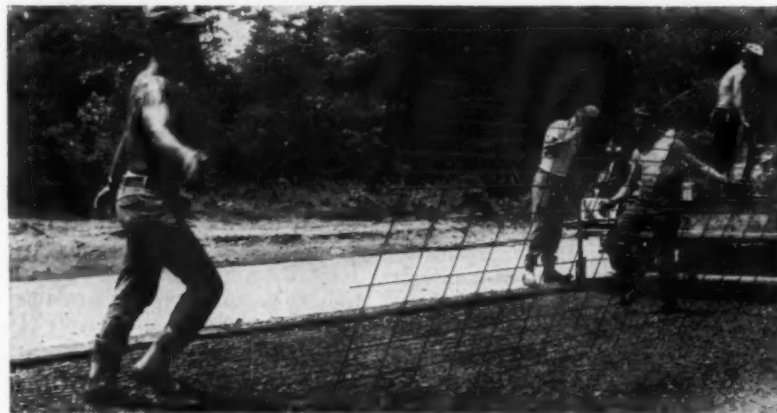
"I estimate that at the end of a working day this Pittsburgh Steel fabric saves us about one-third the installation time required with ordinary fabric."

The man directly in charge of the

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On the job in Glens Falls, N.Y., a section of Hinged Road Fabric is handled easily and quickly by just two men.



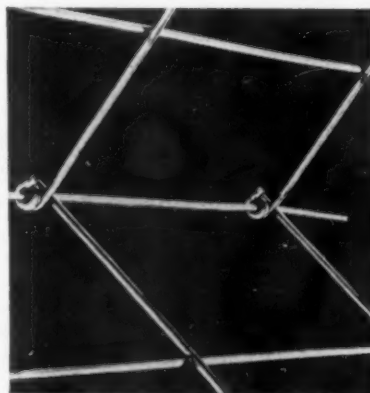
Down goes Hinged Road Fabric in just seconds—and as flat as a living room rug.

fabric's installation—Paving Foreman John Picciocca who has worked with all brands of road fabric for the last 12 years—had this to say:

"What really sold me on Hinged Road Fabric is that it doesn't poke through the concrete while it's taking a set. That's a big problem with ordinary fabric. When that happens, you either have to cut the wire or repave the spot to cover the wire. That's murder on costs."

If you're in the roadbuilding business, you'll be dollars ahead—like Torrington—when you let Hinged Road Fabric provide fast, economical reinforcement on your next job.

Contact your nearest Pittsburgh Steel Products sales office listed here.



Unique hinge is the result of two years' development work.

Hinged Road Fabric

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Lighter, Stronger Prestressed Concrete Beams Seen for Highway Bridges

Prestressed concrete deck units for interchanges and other highway and street bridges will be still lighter and more economical, if current research in this field bears fruit.

This is one of many developments reviewed during the 6th annual Prestressed Concrete Convention, held September 27-30 in New York City. The expectation that concrete bridge girder design will evolve further came from several sources. The Portland Cement Association is actively engaged in research on beam design at its structural laboratory at Skokie, Illinois. And out in Washington state, a consulting engineer, Dr. Arthur R. Anderson, of Anderson, Birkeland and Anderson, Tacoma, has developed and tested a girder design which offers possibility of improving the competitive position of prestressed concrete for short and medium span highway structures.

Laboratory work on development of continuity in precast prestressed members by composite construction was reviewed by Dr. Ferdinand S. Rostasy, Associate Development Engineer for the Portland Cement Association. This research is aimed at extending the competitive position of prestressed concrete by enabling fabricators to utilize the economies inherent in continuous construction over multiple spans. Presently precast, prestressed units are generally utilized for simple span construction only. Several means of achieving continuity have been explored. The work has centered chiefly on means by which continuity comes into effect for live loads only. This is normally done by the embedment of deformed reinforcing bars longitudinally in the

cast-in-place deck slab over interior support piers.

On the development in Washington state, Dr. Anderson used the theme, "New Design Concepts for Concrete Bridges." He told of a proposed lighter beam series developed by his consulting organization. One aim is greater portability. Designed in 10 ft. increments for spans from 30 ft. to 100 ft. the girders include a more slender (5 in.) web than the present AASHTO-PCI series. The rather flat upper flange is shaped more like the steel girder flange, with greater width than used in the present standards.

Since 1957 these beams have been used in Washington in highway bridges at an "extremely favorable" cost, typically about \$13 per lin. ft. of girder compared with \$16 for standard prestressed units. A saving of \$2 per sq. ft. of bridge is considered possible for spans of 90 ft., and a general saving of 20 percent in the cost of bridge superstructures is considered obtainable in this region by these new units.

A feature of the new girders is a very high strength concrete, as high as 9,500 psi being reported with no-slump concrete used. Lengths up to 160 ft. are feasible, and the lighter and stronger design is said to make longer clear spans feasible for expressway overpasses. Tests have shown that near-zero stress conditions prevail in the bottom flange at full working load in typical spans. Hauls as great as 120 miles have been made in delivering girders for bridges in the Washington program.

The Prestressed Concrete Institute's convention spotlighted the

rapid growth of the prestressed concrete industry as well as the continued technological advances. Among the speakers were engineers from Russia, England, Belgium, Austria and Canada.

The program included reports on several outstanding concrete bridges, particularly the Lake Oneida bridge in New York state (with central span of 320 ft.), built to date in the Western Hemisphere, William Mayhew of Terry Contracting Company as spokesman; also a preview of the multi-span bridge being built across Lake Maracaibo in Venezuela, with Professor Riccardo, University of Rome the speaker. Professor Daniel C. C. Vanderpitt, University of Ghent, Belgium, described posttensioned structures as built in Germany and other parts of Europe.

Closer to the scene of the convention, chief engineer John M. Kyle of the Port of New York Authority outlined design and construction features of prestressed concrete bridge and building work totaling over \$6 million constructed recently by his agency.

The technical sessions of the convention were paralleled by meetings of producers, who considered marketing, manufacturing and other business aspects of their industry. It was revealed that the rash of fabricator plants which sprung up a decade ago when the prestressed concrete idea was heavily promoted has been followed by a shake-out of some firms, the ones remaining now experiencing a more stable business in prestressed building planking, girders for buildings and bridges, and other units capable of semi-mass if not mass production. The industry today is repre-

sented by more than 230 producing plants throughout the U.S., with prestressed concrete characterized as a \$200 million industry expecting to grow at the rate of some 20 percent a year.

Fifty-two firms supplying products or services in the prestressed concrete field had exhibits in connection with the convention.

During the convention Jacob O. Whitlock, president of Midwest Prestressed Concrete Co., Springfield, Ill., was elected president of the Association. He succeeded Randall M. Dubois, of Freyssinet Co., Inc., New York. Robert J. Lyman of Atlas Structural Concrete, Inc.,



Jacob O. Whitlock, president-elect of the Prestressed Concrete Institute.

El Paso, Texas, was named vice-president and Robert A. Matthews, Precast Industries, Kalamazoo, Mich., treasurer.

New directors elected were: Harold R. Hutchens, Carter-Waters Corporation, Kansas City, Mo.; W.C. Givens, Capitol Concrete Corporation, Jacksonville, Fla.; Robert H. Singer, Ben C. Gerwick, Inc., San Francisco, Calif.; Harry Edwards, Leap Concrete, Inc., Lakeland, Fla.; Edward Schechter, Stressteel Corporation, Wilkes-Barre, Pa.

Charles B. Kiesel, Jr., Raymond International, Inc., New York, N.Y., and Elmer D. Clark, Superior Sand & Gravel, Phoenix, Ariz., were re-elected to the board, and Ezra C. Knowlton, Utah Sand & Gravel Products Corp., Salt Lake City, Utah, continues as a director.

The Prestressed Concrete Institute's headquarters is at 205 W. Wacker Drive, Chicago, Illinois, with Norman L. Scott, executive secretary.

Prestressed Girder Bridges Double as Heavy Utility Carriers

Two post-tensioned concrete girder bridges embodying an interesting design feature were constructed in recent weeks in New York City. These are the Broadway and Wadsworth Avenue overpasses for the Trans-Manhattan Expressway just off the George Washington Bridge. Delegates attending the Prestressed Concrete Institute annual convention in New York, September 27-30, had a chance to see some of the girders being set.

The design feature is the utilization of the spaces between girders

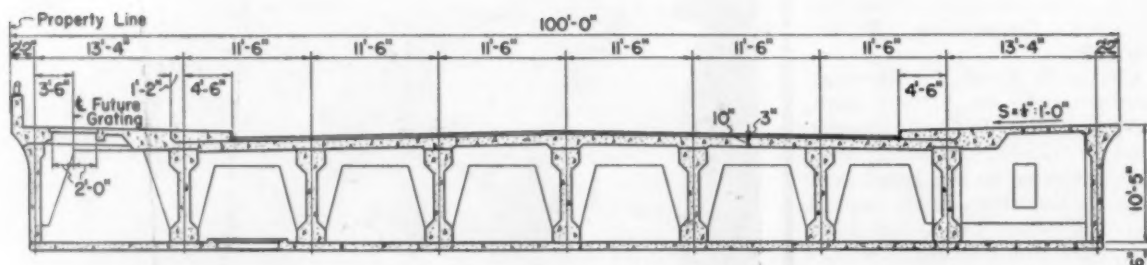
as enclosed duct areas for a bristling array of utility lines. As shown in the accompanying cross-section, the deck for each structure embodies conventional-shaped interior girders and facias, typically spaced on 11' 6" and 13' 4" centers, respectively. The girders are sheathed on the underside by a reinforced concrete slab 6 in. thick, tied to the girders by reinforcing. The concrete deck pavement is tied to the girders (but not shear connected) by reinforcing rods left exposed in the girder precasting.



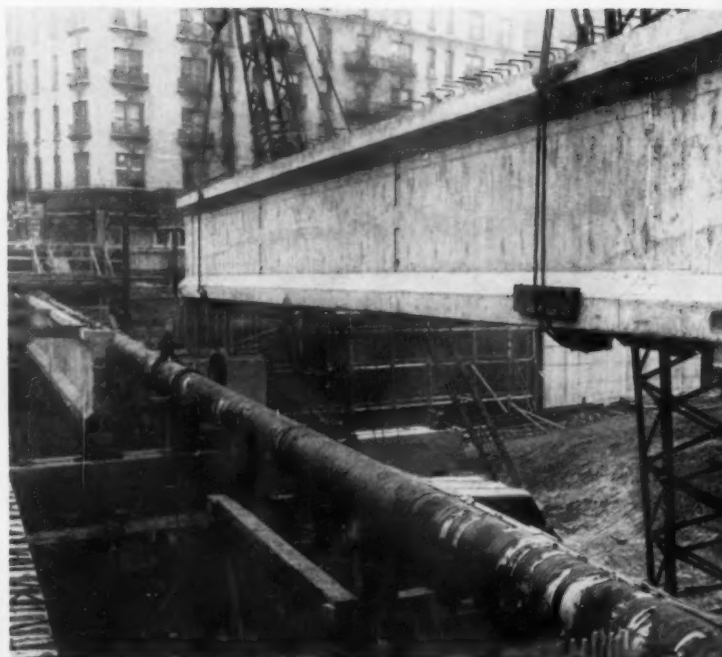
Here forms are seen in place below for the under-slab that will form the utility "tunnels" between girders. Form supports also seen partially constructed for the deck slab.



Three truck-cranes—two stationed on the depressed express roadway below—are snaking a 90-ton girder into position for the Broadway bridge.



Showing typical spacing of post-tensioned concrete girders for structures spanning the new Trans-Manhattan Expressway. The enclosed spaces between girders house piping and ducts for water, electric power, gas and other utility lines. Utility lines were carried during construction by means of heavy I-beam trestles located alongside, or in some cases between girder positions.



Showing how utility piping and cables were held in suspension during erection of the bridges, by means of elaborate trestles, paired I-beams and other devices. Protection of utility trunks from mishaps during the construction was an important part of the project planning.

The beams, 90 ft. long and 8' 6" deep, were fabricated for Brookfield Construction Co., prime contractor, by Pre-Crete Company, of Queens, New York City, and transported over the arterial street system to the job by truck-tractor and dolly. Hauling and setting of the 80 and 90 ton units was done by Eddy Steel Company using truck cranes.

Post-tensioning was done at the casting yard, the sheet metal ducts being grouted with a mixture consisting of two parts type 2 portland cement, one part fly ash and 1 percent Sika Interplast B, with the water-cement ratio 0.4 to 0.5.

The Wadsworth Avenue structure was placed to full width while traffic was detoured. The adjoining Broadway bridge, the first to be built, was constructed one-half of it the 80-ft. deck width at a time to better accommodate traffic.

Acknowledgments. For Brookfield; John Sorensen is general superintendent, Arthur Shaw project engineer. For the Port of New York Authority, Harry Druding is senior resident engineer, George Husing and Stan Forman resident engineers for the New York side.



The 80 ton precast fascia girders were given this paneling effect as part of the architectural treatment for the expressway.



Operator in the background has blown out sawed joints with compressed air, while in foreground Protex rubber asphalt sealing compound is being applied.



Rex track-type subgrade grade planer was towed by motor grader and front end loader in tandem.

Aggregate supplied to stockpile by International 220 drawn Lufkin trailer dumps.



TRIPLE BATCH PAVER

Continued from page 44

The slip-form paver for this job had been modified by replacing the original vibrating screed and tamper bars with 10 "stinger type" Maginniss high frequency vibrators.

Everyone interviewed on the project was enthusiastic about the results obtained from the high-frequency vibrators. Albert Chotvac, project engineer in charge of paving, said this type of vibrator setup is an aid to rapid routine placement with a stiff mix (average slump $1\frac{3}{4}$ in.) The slump was varied slightly according to prevailing weather conditions. During high daytime temperatures and hot winds, the slump was normally increased somewhat; at night and on cooler days, it was decreased accordingly. Concrete vibrated in this manner apparently set more quickly even when it was somewhat wetter.

The project engineer submitted daily incident reports to district engineer Lawrence C. Bower on the job's progress and problems. The reports accounted for down-time, nature and cause of trouble, and included a record of the location and spacing of all initial surface irregularities which exceeded the tolerance of $\frac{1}{8}$ in. in 12 ft.

Surface irregularities were recorded by two of the contractor's crew, using a Viking roughness indicator, supplemented by a device which engineer Chotvac designed and built. This device sprayed paint wherever the roughness tolerance was exceeded. The correlation of excessive roughness with the working conditions, as indicated in the incident report, made it possible to largely determine the cause of roughness and how it might possibly be prevented as the work went along. Chotvac's belief was that any trouble with equipment or any major change in paving procedures caused pavement roughness. He agreed with the contractor's superintendent that the paving had to be continuous and mechanically uneventful to secure the best surface quality.

Records on this job indicated a bump on an average of every 200 ft., although in many instances the paver had gone as much as 2,000 ft. without any spots exceeding allow-

Continued on page 76



Turner Heights, a typical DeKalb County subdivision paved with soil-cement. Only 8 to 10% portland cement is used, although soil is of poor quality. DeKalb County now has in service more than 1,064,000 sq. yds. of soil-cement pavement.

On DeKalb County, Georgia, streets and roads . . .

Modern soil-cement—the economic answer to urban county “population explosion”

“Soil-cement has proved so satisfactory that in the last 4 years we have annually placed this type of pavement on 12 to 15 miles of subdivision streets.”

That's what DeKalb County engineers report—and it's typical of reports from many street and highway departments. One good reason is low maintenance costs. Soil-cement stays lastingly solid. That's

why it won't wash out or pothole.

Soil-cement is economical to place because 75% of the materials usually are free: soil, old gravel roads—even broken-up blacktop—mixed with portland cement and water, then rolled solid. A thin bituminous topping completes the pavement!

Soil-cement is waterproof, can withstand rain the day it's placed. And core tests show soil-cement

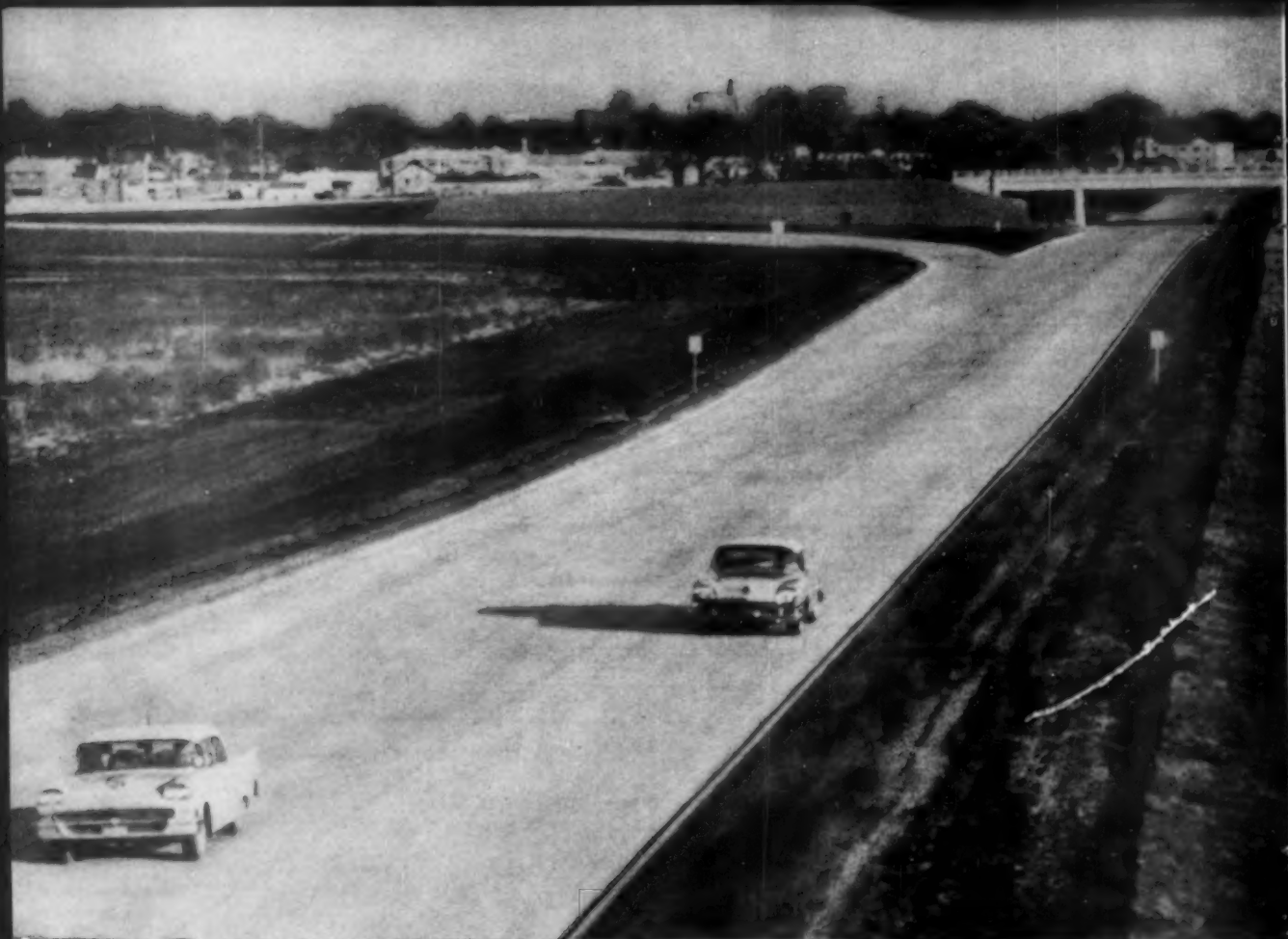
gains in rock-hard strength as it ages.

These are solid reasons why soil-cement is the fastest-growing low-cost pavement for roads, streets, shoulders, subbases, airports and parking lots.

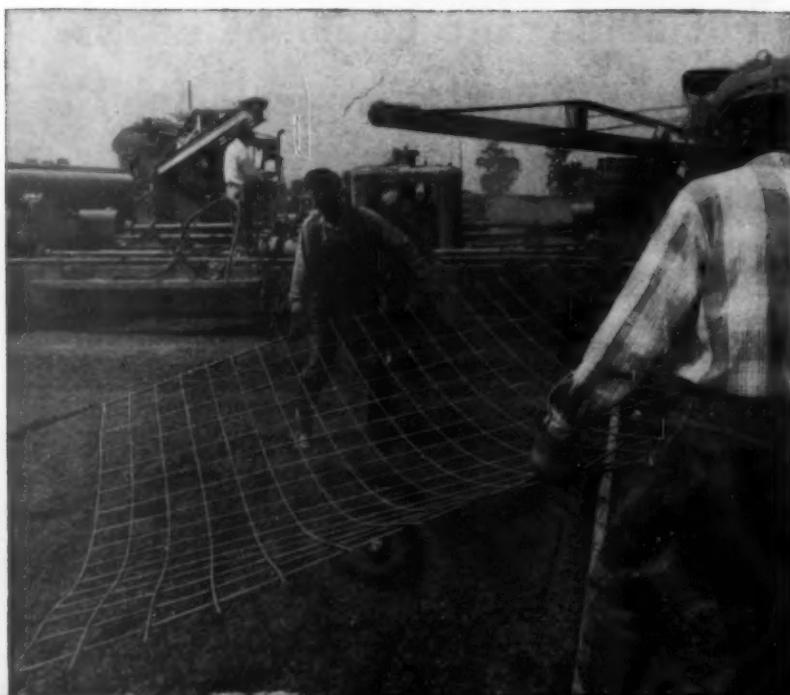
PORTLAND CEMENT ASSOCIATION

A national organization to improve and extend the uses of portland cement and concrete





Steel reinforced ...to stand up



PROJECT: Portion of Northwest Expressway just west of Cumberland Avenue Interchange, Cook County, Illinois

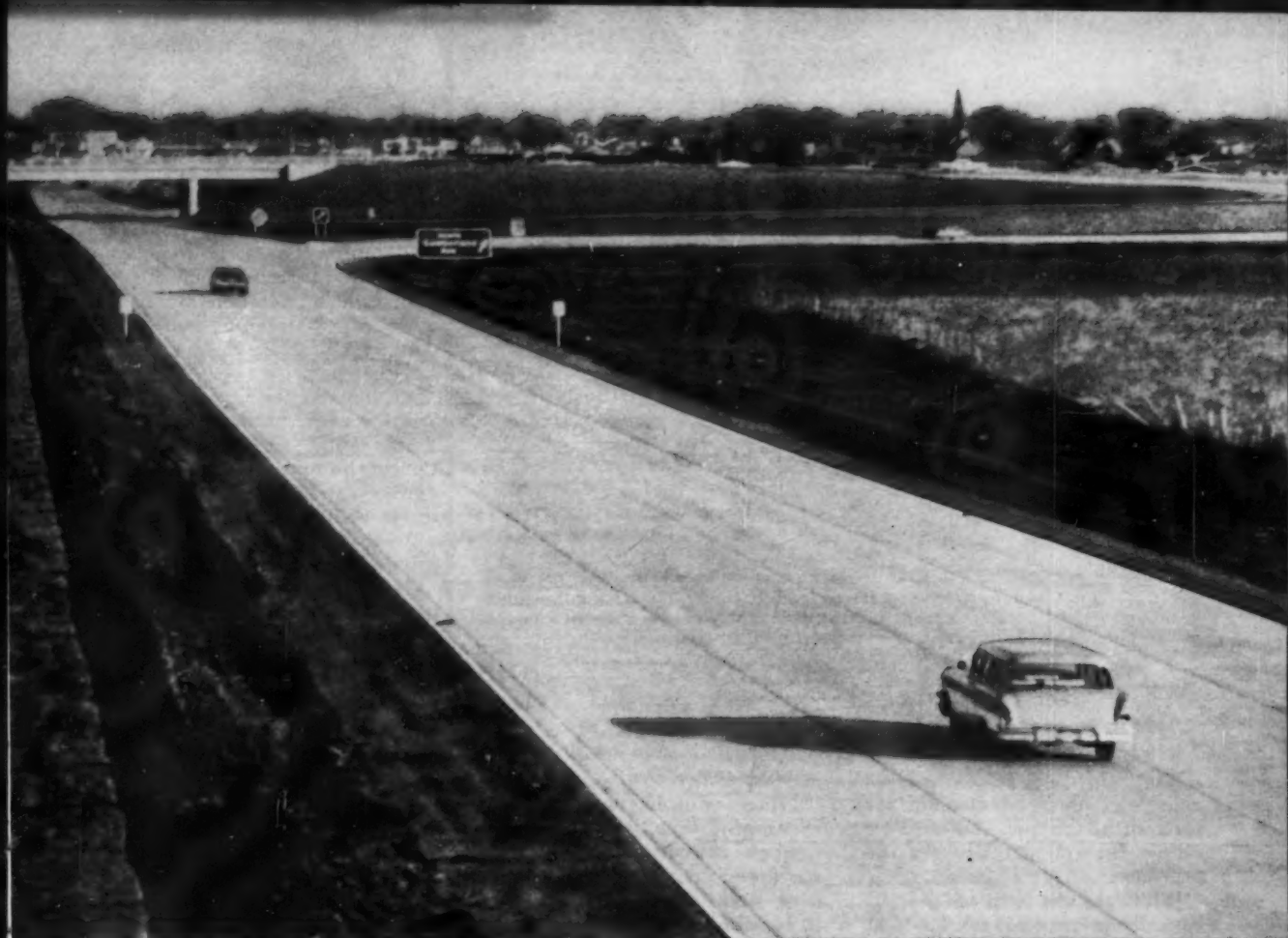
OWNER: Cook County Department of Highways

CONTRACTORS: Arcole Midwest Corp., Evanston, Illinois

WIRE FABRIC DISTRIBUTOR:
E. W. Zimmerman, Inc., Chicago, Illinois



This mark tells you
a product is made of modern,
dependable Steel.



under the hi-speed pounding of modern traffic

Cook County, Illinois has opened the first section of its new Northwest Expressway. And, like other expressways built under the authority and supervision of that county's Department of Highways, it is steel reinforced.

An anticipated daily count of 31,000 vehicles is expected on this newly opened 4½-mile section which extends from Foster & Central Avenues to the Illinois Toll Highway. This figure indicates what this already busy strip will be subjected to as the traffic load gets heavier. And it points up the importance of building into all new roads and highways the strength it will take to stand up under the almost ceaseless pounding of modern hi-speed traffic in the years ahead.

Highways reinforced with steel have a balanced

design in that all edges and corners are fully protected. USS American Welded Wire Fabric accomplishes distributed load transfer and reduces stresses about 30% which accounts for the truly superior performance of reinforced concrete over non-reinforced concrete. Reinforced pavements provide a safe, smooth riding surface that lasts.

USS American Welded Wire Fabric is today stronger than ever. Minimum tensile strength is now 75,000 psi and minimum yield point is now 60,000 psi. It has reserve strength for heavier pounding and it is available in a completely machine fabricated form, ready for immediate placement. For more information, write to American Steel & Wire, 614 Superior Avenue, N. W., Cleveland 13, Ohio.

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(Left): Project engineer Albert Chotvac demonstrates the Viking roughness indicator. (Right): Chotvac using his own paint spray type of roughness marker which followed the Viking unit to mark spots needing attention.

TRIPLE BATCH PAVER

Continued from page 72

able tolerances. Automobile test runs up to 100 mph indicated excellent the riding quality of this pavement.

While the slip-form paver left a basically completed finish, some hand finishing was done with 12 ft. straightedges providing added in-

surance that evenness tolerances would be met.

Whenever paving stopped for any appreciable time, a wooden bulkhead was placed. In bulkheading it was found desirable to remove the edge concrete for a distance of 16 ft. back of the header to allow the placing of 16-ft. length 1" x 8" board along each side of the pave-

ment. This provision of a 16 ft. x $\frac{3}{4}$ in. indentation on each side of the pavement provided space for backing the slip-form paver into position and accurately proceeding on alignment when work was resumed.

The project went on a 22-hour (two-shift) basis early in August, under which operations were shut down for 30 minutes four times daily for fuel and mechanical service.

Sawing and Sealing. Transverse joints at 20 ft. spacing and the centerline joint were sawed using a Concut Jointmaster supplied by a Ford S600 water truck. Joints were sealed with Protex rubber asphalt (SS-S-164, applied at 400° F) using a Clipper kettle.

Acknowledgments. Gardner Construction Company subcontracted gravel, oil and shoulder work to Schmidt Construction Co., of Arvada Colorado; batch and aggregate hauling, to Griffin Brothers, of Amarillo, Texas; joint sawing to Truelock Sawing and Sealing Contractors, of Lakewood, Colorado.

The contractor's organization was headed by William S. Hasse, general superintendent, George Monts, Virgil Kiser and W. Lawrence Rovedo as foremen and Lloyd Thompson, master mechanic. Preston Skitt was project engineer for the Colorado Department of Highways.

Prize Winning Bridge, Dedication Site



This bridge is the site of dedication for the new Exeter Bypass Freeway in New Hampshire. The 3-span welded steel girder structure was built by E. D. Swett, Inc., Pembroke, N.H. Its designer is Robert J. Prowse, New Hampshire highway department engineer, who won a \$1,000 national bridge contest award (American Bridge Division, U.S. Steel) for its design.

"IN PLACE" BLASTING

Continued from page 58

ules up in spite of the complications of this project is the successful use of a new series of millisecond delay electric blasting caps developed by Atlas and used for the first time at the Stroudsburg blasting site. The new series has millisecond delay periods ranging through 38 time intervals, the first time this number has ever been available.

Since the contractor was limited to a set amount of explosive energy per delay, this increase in delays meant that Beers could shoot much more material per shot without exceeding the limits previously established for safe blasting in the congested area.

If Beers had been restricted to the conventional amount of millisecond delay periods per shot (16) it is estimated that it would have been necessary to shoot every three hours to meet production schedules. Now the contractor shoots twice daily. Fewer equipment moves are required and less frequent shooting has kept criticism to a minimum.

The success of the unusual blasting operation results from the close supervision and control exercised by general superintendent, J. F. Raynock and project superintendent, W. C. Henderson of J. H. Beers, Inc. They are assisted by Alfred Smith, engineer. Resident engineer for the Pennsylvania Department of Highways is William Moyer, and Glen Claypool is in charge of soils engineering.

Final Inter-American Link in Costa Rica

Federal Highway Administrator Tallamy announced that work has begun on a bridge construction contract in Costa Rica. Its completion will enable motorists to drive the entire length of the Inter-American Highway from the U.S. to Panama City. The contract let by Costa Rica with U.S. concurrence covers 99 concrete and steel bridges in a now unusable segment of 133 miles between San Isidro del General, Costa Rica, and the Panama border.

Job Safety

Lightning Protection Tips for Workers

When an electrical storm is approaching, construction workers in exposed positions should seek proper shelter—but what is a safe shelter?

According to "Construction Safety Hints" by the National Safety Council, a worker is in an exposed position when he is in such a place as: on top of steel framework or a building roof; on the outside of or near a crane; on or close to a bulldozer or similar equipment; on the ground in contact with machinery; on a hilltop; in open areas isolated from higher objects; and there are many other exposed locations.

Positions of relative safety from lightning are those that are low in a steel framework or inside a substantial building; in a crane cab or in an automobile; in a ditch or other ground depression; or, if in a level open area, flat on the ground (lying prone).

Small sheds, isolated trees, towers, power or phone line posts, and other upward projecting objects should be avoided.

Since the period of greatest danger often is just before a rainstorm breaks, a person in an exposed position should not wait for the rain to run him off the job. Workers should allow plenty of time to secure loose materials; cover work, machinery and materials subject to water damage; and to retreat to shelter or other relatively safe position.

Winter Tips for Truck Drivers

Contractors who operate trucks in winter will find useful safety hints in a booklet, "Keep Rolling with Safety in Winter Weather," outlines the six major hazards of winter driving, including increased braking distances and the effect of temperature on starting and stopping. Test facts on jackknifing and its prevention, as well as maintaining control in skids, are explained in detail. Use of tire chains is discussed - and strongly urged.

A free sample copy is obtainable from the National Safety Council, 425 North Michigan Ave., Chicago 11, Ill.

CONSTRUCTION SAFETY HINTS No. 31, distributed by the National Safety Council with its January, 1960, Construction Section Safety Newsletter, contained several broad statements to the effect that ingredients of epoxy resin concretes present serious injury hazards.

The statements were misleading, the Council explains in a later bulletin, in that they implicitly included *all* epoxy resin concrete mixtures in the description of hazards. According to latest information (specific data provided by correspondent manufacturers), a number of epoxy resin concrete mixtures have been developed that offer no appreciable risk to skin and eyes ... present no significant dermatitis or toxic hazard from hardeners or catalysts.

Some epoxy resin concrete formulations use curing agents that are not known to be irritants and have the ability to cold-cure with low heat reaction. Such action excludes the hazards resulting from the effect of heat on the other curing agents.

Many state laws require specific mention of potentially harmful materials—and/or hazardous side effects in the processing and handling of such materials—on labels of all containers in which the materials are packaged. Reliable manufacturers include such labeling, as a matter of ethical practice, on their products distributed in areas where there is no legal requirement.

Various manufacturers have developed epoxy resin concrete mixtures which they advertise as being without hazardous potential. Presumably the labels state that the contents are safe to use.

The Council advises caution, meanwhile. If labels on containers of materials you are using, or have on hand for future use, do not state that the materials are safe or do not list precautions to follow in their use, the precautions as shown in Construction Safety Hints No. 31 should be followed.



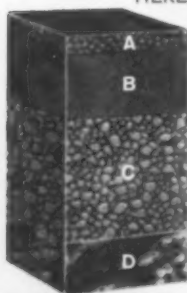
North Carolina Highway Engineers



STAGE CONSTRUCTION IN WIDTH—This new section of N. Carolina's Interstate 85 is a good example of *stage construction in width*. Two new lanes (left), built with DEEP STRENGTH Asphalt pavement, have been constructed alongside existing two

lanes of Route 70 (right) to form a new section of this Interstate Highway. This combination of DEEP STRENGTH Asphalt pavement and *stage construction* is helping states to stretch construction dollars and still provide necessary highways quickly.

HERE IS DEEP STRENGTH DESIGN ON I 85



- A** 2-inch Asphalt concrete surface course
- B** 6-inch Asphalt concrete base course
- C** 12-inch Stabilized Aggregate Base Course
- D** Subgrade



SOLVE TROUBLESOME SOIL AND DRAINAGE PROBLEM

Build North Carolina Interstate 85
with new DEEP STRENGTH Asphalt pavement

For new Guilford County section of Interstate No. 85, North Carolina Highway Engineers have chosen DEEP STRENGTH Asphalt pavement.

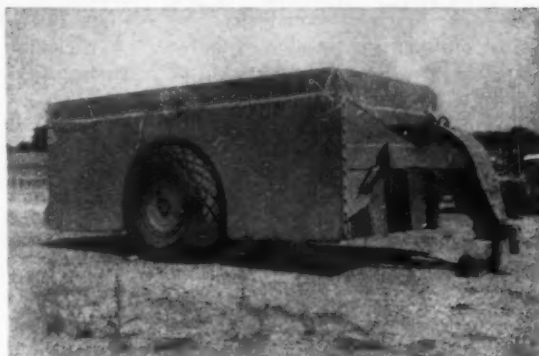
In Guilford County, engineers faced a difficult problem. The native soil in this area contains extensive strata of silty clay with high moisture content which could weaken the support of a finished road. To eliminate this threat to Interstate 85, the foundation was carefully proof-rolled with a 50-ton pneumatic tire roller to locate weak areas. These areas were then strengthened by replacing silty clay with suitable materials or installing necessary sub-drainage. It was only after this painstaking effort that actual construction of the pavement structure was begun.

In building this new part of Interstate 85, N. Carolina engineers followed several precepts of DEEP STRENGTH Asphalt pavement design. Notice in pictures and cross-section (below) the use of 6 inches of Asphalt base under 2 inches of Asphalt concrete surface course . . . Asphalt surface treated outside shoulder . . . depressed median for good drainage . . . heavy proof-rolling of the subgrade . . . and use of high-contact pressure pneumatic tire proof-roller on the aggregate base course. Here is strength and durability!

When designed like this—for DEEP STRENGTH—Asphalt pavements will carry the heaviest traffic loads without distress and with minimum maintenance. Also, use of Asphalt pavement avoids high repair costs due to damaging action of de-icing salts experienced on other pavement type.

BEST USE OF ROAD FUNDS

State after state is finding that when Interstate Highways are built with Advanced Design DEEP STRENGTH Asphalt pavements, the optimum use is made of road building funds. That's because the Advanced Design Criteria permit inexpensive Asphalt base to be substituted, within limits, for more expensive Asphalt concrete surfacing. In addition, when Asphalt treated base is used in place of untreated base, reduction in total structure thickness may be allowed.



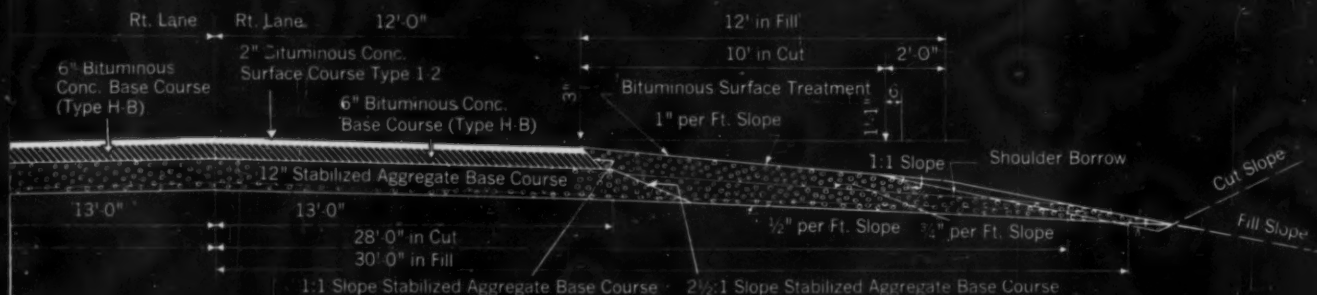
Heavy compaction—This 50-ton rubber tire roller was used to proof-roll the subgrade. The aggregate base was proof-rolled with a 25-ton pneumatic tire roller exerting 82 psi contact pressure.



Outside Shoulders of stabilized aggregate base were Asphalt surface treated for width of 10 ft. One-half inch granite stone chips provide better traffic lane demarcation.

THE ASPHALT INSTITUTE

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PROFITLESS BIDDING

Continued from page 47

eral have become less and less while industry volume has risen steadily. Obviously, he said, still more dollar volume isn't the cure. Better pricing and cost reduction are the only keys. Doubling of volume otherwise will merely mean that a contractor "takes two jobs at a loss instead of one."

With respect to the highway job outlook, Marshall noted that the \$3.5 billion in highway awards for 1959 represented a doubling from the 1952 dollar total. The profit problem is partly explained by the fact that the high 1959 figure is a \$1.0 billion drop-down from 1958's record road awards, and that the present year's volume will be about \$1.5 billion down from that anticipated for 1960 under the original 13-year Interstate program. "It was a serious error," said Marshall, "to assume that expansion in jobs would bring better prices."

Subcontracting Problems

Highway contractors, who are doing an increasingly urbanized type of work, as well as those in building and heavy construction, showed interest at Phoenix in the subcontracting problem that plagues building work. Broker-type firms have left a trail of ruined subcontractors by their bid peddling and other sharp practices. On the other hand, a good many building contractors have enjoyed reasonable profit by developing their own markets. Meanwhile legislation is actively being considered to bring about a less destructive subcontracting relationship.

The subcontracting problem also came up in Monday's highway session at Phoenix. AGC past president, George Koss, of Iowa, said that this is still a point of trouble in many states where package type highway contracts are being awarded. The Bureau of Public Roads still has on its books the edict that subcontracting on federal-aid jobs must be limited to 50 percent of the dollar volume. (Informally this ratio has been exceeded in some states. Editor.) A recent BPR directive has relaxed the 50 percent rule under certain conditions. An escape clause now permits subbing certain specialty items such as light-

ing, traffic signals, etc., outside the 50 percent limit. However the major items (structures, grading and paving) continue to remain under the restriction.

Koss proposed that AGC seek to get an OK on naming a subcontractor in the contract proposal, this subcontractor's work not to come under the 50 percent limitation. Koss, who favors package rather than split jobs, contended that this step would tend to discourage brokerage or bid shopping trend in highway work.

Discussion on Koss' proposal was vigorous. W. Ray Rogers, of Portland, Oregon, noted that the highway contractors had voted to keep to the 50 percent policy at AGC's last annual convention (early in 1960 at San Francisco). Assistant commissioner of Public Roads George M. Williams, present at this session, explained that the recent modification permits the Federal Highway Administrator to review projects and permit certain subcontracting where it is public interest. The Bureau of Public Roads in Washington will review jobs where the percentage of subbing is critically near 50 percent.

AGC's 'Better Highways' Role

A feature of the highway session was the review of the Better Highways Information Foundation, to which many of the AGC chapters have subscribed. The BHIF's newly-appointed vice president and treasurer, Erskine Stewart, outlined the Foundation's purpose, present status, program for the immediate future, and need for further financial support.

As reviewed in Roads and Streets, October, the BHIF is indeed off the ground, the delegates learned. Over 500,000 copies of a printed brochure have been sent out to local agencies for distribution. Work is being rushed on a planned program covering every type of educational material: TV strip film, radio material, cartoons, posters, speeches for varied occasions, newspaper and magazine feature articles, and additional printed brochures explaining the need for highways.

The program, Stewart emphasized, is not intended to aim at the Interstate road program alone, nor merely to "hit Congress for action next January," but will sell broadly the need for a long-range highway

program. A series of regional conferences during the autumn weeks is expected to get the program into high gear at "grass roots" levels in all states.

The discussion brought out the fact that the \$350,000 first-year budget for the BHIF represents only \$94.80 for each million dollars of current federal highway fund allocation. This is only a tiny fraction of one percent of the road program. This compares with 100 times as much money being spent by the American Petroleum Institute in its current campaign to get Congress (and the states) to reduce the gas taxes from which roads are principally financed today. The AGC delegates were told that their small participation represents a 'bargain' opportunity to help insure the future of the highway job market.

BPR Inspection Policy

Another topic which aroused much interest at Phoenix was that of the inspection and testing procedures of the Bureau of Public Roads on federal-aid highway jobs. This has been a bone of contention in many states, with some contractors feeling that federal double-checking of state inspection is holding up job approval and "making unnecessary trouble for everyone." George M. Williams, assistant commissioner for engineering, Bureau of Public Roads, read a prepared statement which clarified the Bureau's position. The Bureau's intention is not to encroach unnecessarily on the responsibility of the states to carry out federal-aid highway construction. But nevertheless under the historic role of the federal government since the first federal-aid highway act (1916), the government has a clear responsibility for securing compliance with construction standards.

Following the discovery in 1959 that quality of work was not up to standard on certain state projects, the Bureau issued a series of memorandums aimed at tightening the procedures.

A BPR memo on this subject (No. 20-5-60) dated April 29, 1960, caused so much concern that it was No. 1 on the agenda of a joint AGC-BPR meeting held on September 9 in Washington with about a dozen selected representatives present for each agency.

This memo announced a revision in policy covering three points:

1. Payment of progress vouchers to be deferred until Bureau engineers could review the validity of all material test reports and other necessary reports concerning quality of workmanship.

2. Random material inspections to be made during on-the-job project inspection by Bureau engineers.

3. Record samples of finished work in place to be taken at time of final inspection, for certification purposes. Such certification to accompany the final voucher submitted for federal payment.

The AGC leaders at the September joint meeting in Washington voiced their concern that these requirements were slowing up job payments and hampering contractors. At Phoenix the AGC highway delegates were given copies of a letter just sent out to AGC chapter secretaries on the joint meeting. The letter said in part:

"Although it was generally agreed that increased attention to some construction features is needed to assure those critical of the highway program that value is received, it

was repeatedly stated that current interpretation of inspection requirements have resulted in construction delays, confusion, unwillingness to accept responsibility and a general breakdown of on-the-job working relations. It was emphasized that a continuation of these detrimental conditions would increase the cost of construction and seriously jeopardize the highway program.

"Several recommendations for early remedial action were offered. These included the rescinding of the inspection memorandum and the issuing of an instruction which would restore the confidence and responsibility of state project engineers. It was suggested that this action could be taken and still retain inspection controls which will assure full contract value."

During the September 9 joint meeting, Bureau representatives indicated that conditions as expressed by AGC members seemed to be caused by misunderstanding and misinterpretation of the new instructions by both BPR engineers and state highway department personnel. Final tests of work in place were not expected to cause difficul-

ties of any significance providing tests during construction progress are generally satisfactory.

As a possible aid to the conditions, it was pointed out that the Special Committee on Contract Procedures of the American Association of State Highway Officials is developing new guide lines. These may help clarify procedures for inspection. "These guide lines, together with continued discussion of the intent of the new BPR instructions, should, within a short period of time, provide an understanding of inspection requirements which will be reasonable, workable and of benefit to the highway industry," the AGC letter said.

It was indicated that the Bureau would review the overall subject of construction inspection and determine if additional revisions to current procedures may be advisable.

M. Clare Miller, San Ore Construction Co., McPherson, Kansas, was nominated as AGC's president for 1961. Miller who is 1960 vice-president has headed AGC's Highway Division and has been a leader in supporting the highway program need at Congressional hearings.

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For the past twelve years, the department has

*Additional information on request.



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A ticklish stage: the big span is on its way across.

Truss Winched Across Rapids

A fifteen-man crew recently used the traveling clothesline method to snake a 250-foot steel highway bridge truss across the roaring Churchill River in Saskatchewan. The bridge at Otter Rapids was one of the biggest obstacles on the new 500-mile La Ronge-Uranium City road.

Even in the rugged, rock, bush and muskeg country of northern Saskatchewan, the Churchill River presented a tough and special problem. The stream is so fast at Otter Rapids that it never freezes over despite 50-below temperatures.

M. B. Pierce, bridge engineer, Saskatchewan department of highways and transportation, explained the problem: "Normally, timber piles are sunk down at intervals across a stream and the bridge steel is erected from timber to timber. This procedure couldn't be followed at the Otter Rapids crossing because



Tower built with bridge floor members is set up and ready.



the flow is too fast and the bottom too rocky. What we needed was an entirely new way to get a bridge over a river."

Square-M. Coleman of Edmonton, the subcontractors for Canadian Bridge Works of Walkerville, Ontario, came up with a scheme that made use of cables, pulleys and power winches.

The steel truss bridge span was erected on the south bank. A 75-ft. steel tower was erected on the north bank utilizing bridge floor beams. Following this, nine $\frac{7}{8}$ -in. steel cables were attached to the bridge truss, thence to the tower, thence to a powered winch truck anchored to solid rock.

On the south bank, six $\frac{7}{8}$ -in. steel cables, attached to a Caterpillar tractor, also firmly anchored held the bridge truss, serving to control its forward movement.



The bridge shown ready for its swing into space and (seen from far bank) after the span came to rest on its bearings.

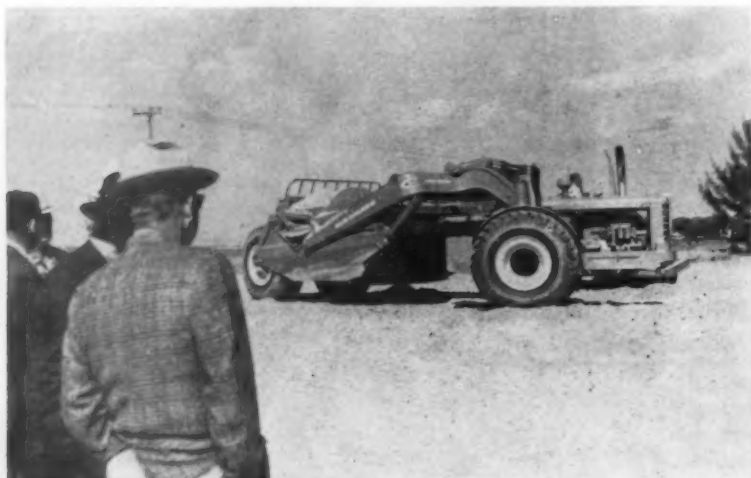


Then the winch engine was started and the bridge truss was literally pulled across the river. The big pull started early Saturday,

March 19 and was completed the next afternoon.

After getting the span across, the crewmen jacked it into final posi-

tion. The tower was dismantled and the beams used for their intended purpose in the bridge flooring.



New Allis-Chalmers Scraper Demonstrated

Demonstrating the new Allis-Chalmers TS-360 all-hydraulic 30-yd. motor scraper to more than 1,600

contractors and Allis Chalmers dealers at the company's two Sunshine Premieres. The first was held at St. Petersburg, Florida, the second at Disneyland, California.

ARBA National Award

An annual ARBA National Award is to be given by the American Road Builders' Association. It will go to an Association member who "shall have made an outstanding contribution to the national highway program."

The first award will be made at the 59th Annual Convention of ARBA, Atlantic City, next March 5 to 8. The selection committee: Bertram D. Tallamy, Federal Highway Administrator; Hon. George H. Fallon, chairman, Subcommittee on Roads, U.S. House of Representatives; and J. N. Robertson, treasurer of ARBA.

Nominations for the first award can be submitted until December 1 by members, affiliated groups, or organized divisions of ARBA. Each nomination should be accompanied by supporting information.



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Bituminous Roads And Streets

Bituminous features appear
between pages 88 through 98

Blow Sand Stabilization Solves Arterial Base Problem

Paving of 8.6 miles of Minnesota trunk highway 65 in Anoka County presented the problem of a 22-mile dead-haul to the nearest suitable pavement aggregate. The soil along the entire right-of-way of this 4-lane-divided highway is largely blow sand, with intermittent peat swamps and a high water table.

Minnesota engineers solved this problem by selective grading and use of existing material for subgrade and base. In doing so they not only provided themselves with valuable experience, but also attracted wide interest from a number of other public agencies confronted with similar problems.

Johnson Brothers Highway & Heavy Constructors, Inc., of Minneapolis, began in July of 1959 on this \$1,200,000 job, with 150 working days to drain, grade, pave and shoulder. The company subcontracted the base course to Jay W. Craig Co., of Minneapolis, with Clarence Nybo as foreman. Since the grading, hot-mix pavement and sodding involved no unusual problems, this report deals only with the 6 in. bituminous stabilized base course.

Design and Specifications: The design and specifications for this project took advantage of the ex-

perience gained on a similar adjoining project built in 1958. On the previous project, the upper 4 in. of the blow sand subgrade was stabilized with a dilute asphalt emulsion treatment to form a firm road on which was placed a 6-in. plant-mixed emulsion stabilized sand base. The principal difference in the two projects is that the one here reviewed involved selective grading and mixed-in-place bituminous stabilization.

The specifications required selective grading to obtain a B horizon 6 in. thick to provide material for the mixed-in-place stabilization. The main requirement of the B horizon material was that it should be non-plastic. The "B" horizon material has 95 to 97 percent passing the No. 40 screen; and about 10 percent passing the 200. This B horizon material was placed and compacted by Johnson Brothers prior to the work on the grade being taken over by the Jay W. Craig Co.

Stabilization was accomplished with AC-1, 200-300 penetration, and performed only when the air temperature was 60° F. or higher. AC-1 was added to the base material within the range of 4.2 to 4.8 percent by weight of the final mixture.

Application temperature was 300 to 350° F.

Mixing was specified to be done with a machine which thoroughly mixed the asphalt with the sand base to a depth that would produce 6 in. (plus or minus ½ in.) compacted thickness in one continuous forward movement.

Maximum density of 100 percent in accordance with AASHO Designation T-99 was required. Surface tolerance was ¼ in. in 10 ft.

Construction Methods: While the prime contractor placed the B horizon layer within the required tolerances, Jay W. Craig Co. found it advisable to reshape and compact the surface, in order to insure that the compacted 6 in. stabilization would conform to the required grade and depth.

Moisture control was of importance in the preparation for the stabilization. A moisture content of from 7 to 8 percent (about the fluff point of the sand) was found best. Proper moisture helped prevent the formation of lenses within the stabilized base, helped insure thorough mixing, and made the mix easier to shape and compact. Motor graders and pneumatic rollers were used in this operation. Experience showed that steel-wheel rollers were not adaptable for the compaction as



P&H single pass stabilizer mixed base in one continuous forward movement. The 10-ft. box required making three passes to cover 28 ft. width of base. Specifications required overlap of previous passes.

Motor grader with balloon tires windrowed and then laid out the mixed-in-place material, a pneumatic tire roller working in close conjunction.





The grader with two rollers secured compaction and final surface tolerance (1/4 in. in length of 10-ft. straightedge). Low spots being checked here.



Transferring AC-1 asphalt to one of Craig's nurse tankers, via a Bros heater.

they tended to create lenses (horizontal or shear planes).

Mixing was accomplished by the use of a P & H model 106 single pass stabilizer, equipped with a 10-ft. box, and capable of traveling at 24.6 ft. per min. Production averaged about 1,000 sq. yd. per hour. The stabilizer was serviced by three asphalt supply trucks (Ford 750's) with 1,500-gal. tanks.

The AC-1 was pumped from over-the-road trailers into the nurse trucks through a Bros heater mounted on an Army 6 x 6 truck. The heater recorded the incoming temperature of the asphalt cement and delivered it to the nurse trucks within the specification limits.

The first operation in the layer compaction was the use of a Ferguson 25-ton pneumatic roller which in effect did the breakdown rolling. A motor grader worked closely behind, dressing the stabilized material.

An interesting feature of the motor grader was a modification to allow the use of balloon tires (22 psi), so that the grader could work on top of the sand grade without rutting and also without a noticeable displacement of blue tops. The contractor used special wheels to mount 16-ply Goodyear airplane tires, 56 x 22 in. rear, and 55 x 20 front.

As compaction neared the final

Continued on page 92

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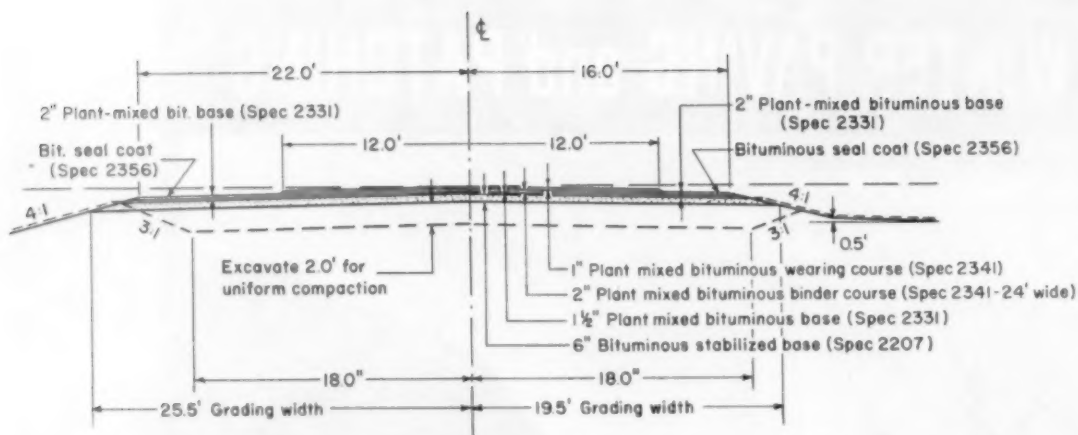
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EMULSIFIED ASPHALT PLANTS AND PROCESSES



Typical cross-section of flexible bituminous pavement for Minnesota trunk 65, designed for heavy traffic.



Winn Hindermann, midwest division managing engineer, Asphalt Institute; Clarence Nybo, foreman for Jay W. Craig Co.; and Kenneth Madole, state project engineer, talking it over on the Highway 65 job.

BLOW SAND STABILIZATION

Continued from page 90

grade, the motor grader windrowed the material to a depth of about 2 in. below finished grade. This allowed the engineers to set blue tops along the centerline for final shaping. The motor grader then feathered the material out, working with a 13-wheel Bros pneumatic roller pulled by a Fordson Major 30. On final completion of compaction the engineers made frequent borings for

depth and density check of the stabilized material.

The final step was to apply 1/10 gal. per sq. yd. of MC-0 or MC-1 as a fog seal. The seal tended to hold the moisture at the desired level in the stabilized mix and minimized raveling under the contractor's hauling equipment. Experience had shown that a kerosene cutback was required in order to be effective. The distributor used was a company-built unit carrying 1,400 gal.

and equipped with an Erickson Air Speed Bar.

In commenting on this project R. V. Curtiss, an official of Jay W. Craig Company, called attention to the close tolerances on the project. Considerable shaping and compaction work has had to be done prior to the mixing with the single pass stabilizer. This operation on such projects, in his firm's experiences, usually follows a grading contractor's operation and their tolerances are considerably different from those required under this contract.

Kenneth Madole, project engineer, called attention to two interesting aspects of the job. The project is considered largely experimental by the state engineers, and is actually the latest stage in a long development process which was pioneered on a number of county roads.

Madole pointed out that a steady, continuous construction operation provides the highest quality work. He and the contractors' men agreed that the more the stabilized mix was reworked, the more trouble experienced. In the infrequent instances where the stabilized mix was either not laid thick enough or did not contain sufficient bitumen, it was necessary to rework the material. Regardless of the best effort on the part of the contractors and the engineers the reworked areas often caused trouble and were the least satisfactory in surface appearance.

About 15 men were assigned to staking and testing on this 8.6-mile project. The engineers maintained moisture and density control. The amount of moisture, as determined

by the cook-out method, was correlated with results obtained by the use of an Olivo Moisture Meter. Engineer Madole considered the size of the sample used in the Olivo to be quite small, but had found the results to be accurate within reasonable limits. He felt that such conditions as hot weather, dry soil and an appreciable breeze made a larger sample desirable, however. Accuracy of the results appeared to depend almost entirely on the skill of the technician. The Olivo worked very well on sandy soils.

Bitumen extractions were made for study purposes by the state laboratory, with the idea that they would help to perfect stabilization by this method.



Final blue tops were set along centerline after top 2 in. had been windrowed. Proper moisture was a big factor in easy shaping and compaction.

Reader Discusses Mineral Filler In Asphalt Mix Design

By letter from Walter C. Carey, Chief, Design Branch, U. S. Army Engineer District, New Orleans. Expressing the author's personal views in discussion of the paper, "How Asphalt Grade and Filler Type Affect Pavement Compaction", by B. F. Kallas, and H. C. Krieger, *Roads and Streets*, August, 1960.

To the Editor:

The article on pages 125 thru 138 in your August 1960 issue on "How Asphalt Grade and Filler Type Affect Pavement Compaction" was of considerable interest to me since it deals with an aspect of asphalt mixture design in which I have long been interested: that is, the relationship of asphalt cement and fine mineral filler to each other and to the physical properties of asphalt mixtures. In my opinion, the article in question at first moved in the direction of dealing adequately with the problem and then veered off.

Some years ago, when the U. S. Army Engineer District, New Orleans became interested in the possibility of developing a reinforced asphalt mattress for river bank protection, a broad research program was launched to study the physical

properties of asphalt mixtures. Most of these properties had not been studied up to that time. Besides recognizing and defining the properties, it was necessary to develop tests for measuring and controlling them, as well as devising testing equipment for making the tests. Unlike most uses of asphalt (i.e., streets, roads, and airfields), where it has long been possible to proceed on what is actually an empirical basis, it was necessary here to carefully consider the various physical properties, because most of them were involved under actual field conditions; that is, the forces could be measured, and the stresses computed.

Among the properties studied were compressive strength, tensile strength, bond strength of embedded reinforcing, shear strength as indicated by the Hubbard-Field stability test, flexural or fatigue bend resistance and abrasion resistance. Those properties were studied throughout a range of temperature. The late F. C. Field of the Asphalt Institute worked with this District's personnel for more

than two years, substantially as a member of the District staff, and had general charge of these investigations.

After running the gamut of tests and studies, it was finally recognized that three physical properties were all-important to the special purpose under study, and that designing and controlling the asphalt mixtures for these three properties would produce a mixture with all the necessary other properties. These three properties were Hubbard-Field stability, fatigue bend resistance, and abrasion resistance. It was later found that mixtures, properly designed for stability and flexibility, would also be satisfactory as to abrasion resistance: that is, abrasion resistance could be considered in the original mixture design research and then ignored unless some significant change in materials occurred. It was finally determined that mixtures for this general category for uses (i.e., water resources structures to resist all forms of attack by water in motion) would consist of river sand, a high percentage of very fine filler

and a high percentage of asphalt cement; that is, no coarse aggregate as a general thing except in massive uses where toughness became controlling, rather than toughness and flexibility.

Although, the asphalt mixtures were always designed on the basis of actual design tests and then field controlled by the same tests, the formula, for the asphalt mattress, was generally on the order of 70 percent of river sand, 20 percent of loess filler (all passing the 200-mesh sieve) and 10 percent of asphalt cement. These studies, tests, and testing equipment are described at greater length in the following publications:

"Asphalt Mixtures for Resisting the Attacks of Water in Motion," 19 pages, 18 figures, read before Association of Asphalt Paving Technologists at New Orleans, La. February 7, 1955, and published in proceedings for 1955.

"Asphalt in River and Harbor Work," 16 pages, 20 figures, read before 1st Western Conference on Asphalt in Hydraulics, Salt Lake City, Utah, September 26, 1955 (Published in proceedings).

As a result of this extended research concerning the physical properties of asphalt mixtures, and the day-by-day application of the results on a working scale, those associated with this development became aware of various relationships between materials and physical properties.

One such relationship was between stability and flexibility, with recognition that any proper design procedure would include simultaneous consideration of both physical properties.

Another such relationship that impressed itself on all concerned was the apparent existence of an optimum ratio between asphalt cement and very fine mineral filler (i.e., somewhat analogous to the water-cement ratio in portland cement concrete); in fact, they began to recognize that the use of very fine mineral filler is really a means for extending the volume of asphalt cement, with all the accompanying advantages and without the accompanying disadvantages. It also became well known to the group that mixtures A, B, and C could be designed with equal stability, but with greatly differing

flexibility or fatigue bend resistance; and that, for a given stability, the mixture with the highest fatigue bend resistance would be superior from the point of view of practically all other physical properties, at least for mixtures for water resources structures. Recent checking in the field, on some of this work, now 25 years old*, tends to confirm these various relationships between materials and physical properties and mixture design. From the appearance of the work, it seems clear that such mixtures may be expected to endure for 50 or more years without maintenance of the mixture as such.

Unlike much engineering construction, every aspect of the work discussed above was under the control of those directing the project;** the basic research and development, designing and building the construction plant, and the final field scale operations. It may be that a certain vision is derived from such an experience and that the experience is absorbed in a way that is not true of the more usual approach to engineering construction; where research and development are one phase, design another, construction another (i.e., the business of the contractor), and maintenance still another phase. As a result of this background, and a substantial amount of airfield paving experience in the United States and overseas in Great Britain in World War II, it seems to the author that paving design, for roads, streets, and airfields, bogs down due to failure to recognize, (1) that paving mixtures must be designed for fatigue bend resistance and stability, at one and the same time, and (2) that the very fine mineral filler facilitates this dual design approach. Ordinarily street, road, and airfield pavements are designed on the basis of stability with the most important property of asphalt being given no proper consideration; that is, fatigue bend resistance. If these points were generally recognized by paving engineers the result would be the use

of higher filler contents and somewhat higher asphalt contents.

Such a concept of the function of mineral filler makes it necessary to recognize that its really valuable property is to be very fine, and that nothing can be considered as filler unless it has a gradation at least as fine as portland cement. It was also clearly demonstrated in the research program that there must be a definite gap between the gradation curves of mineral filler and sand. Much commercial filler fails signally from this point of view. Actually, filler coarser than 200-mesh has no useful function to perform and any such coarse particles simply serve to hold the sand grains farther apart; necessitating more asphalt and more filler if an attempt is made to design on the two bases of flexibility and stability. Where there is an *overlapping* of particle sizes, as when using commercial fillers and sands, any desired stability can be readily obtained, but a substantial degree of flexibility cannot be obtained at the same time. General recognition of the proper nature and function of mineral filler would immediately direct the attention of the asphalt manufacturers and the asphalt paving industry to the existence of unlimited quantities of loess in the valleys of the lower and upper Mississippi, the Illinois, the Missouri, and the Columbia. Loess filler from these sources is undoubtedly the most economical filler for use anywhere in the United States; that is, when fineness of filler is given proper appreciation.

The various propositions, discussed herein, only come out when one commences to design mixtures on the basis of stability and flexibility simultaneously. It is believed that some of the mysterious pavement deficiencies could be minimized by adopting such a mixture design philosophy; for instance, airfield pavements which, under traffic compaction, fail by flushing out asphalt, could not flush asphalt that had been combined with very fine filler. It is possible that the adoption of a mixture design philosophy that attaches due weight to fatigue bend resistance (the real measure of durability) will inevitably lead to the discovery and identification of many of the points set forth in this presentation.

*In the Middle East, there are water resources structures, based upon the use of loess filler and adequate asphalt contents, that are still functioning 3000 years after construction.

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Mixes for Curb Usage

Run-of-plant asphalt paving mixes may conveniently be modified to meet asphalt curb mix requirements states a bulletin from The Asphalt Institute. It is done by the addition of powdered asphalt to the heated aggregate before blending with asphalt cement.

Studies recently completed at the Institute laboratories indicate that the addition of about 15 percent of powdered asphalt to a dense-graded paving mix (based on the weight

of asphalt in the mixture) will produce a suitable mix for curbing, and produce an appropriate increase in binder quantity. This percentage estimate is based on the use of 85-100 penetration grade asphalt. When an asphalt cement of higher penetration grade is used, more powdered asphalt may be required for best results.

"Normally," said the Institute's Research Engineer, John M. Griffith, "asphalt curb mixes require from 0.5 to 1.0 percent more asphalt

than paving mixes, and usually the mixes perform better with a 60-70 pen. asphalt. But it often is difficult to change plant operations to meet these special requirements for limited quantities of curb mix. Therefore, a practical solution appeared to be the incorporation of powdered asphalt, thus modifying the regular plant mix without disrupting the normal plant operation."

The laboratory studies were made with curbing mixes prepared with an 85-100 asphalt cement and varying amounts of high softening point powdered petroleum asphalt and powdered Gilsonite of zero penetration. The powdered asphalt was blended with the asphalt cement in varying amounts to determine the rate of consistency change and the effects on other test properties. Test specimens also were prepared by mixing the powdered asphalt with the heated aggregate, followed by the addition of the asphalt cement.

Superior test results were produced by blending the powdered asphalt with the asphalt cement before mixing with the aggregates. But, as explained by Mr. Griffith, this pre-blending of the asphaltic components is not practical in normal plant operation, and the purpose of the study was to explore effective methods of modifying the plant-produced paving mixtures to adapt them to curb construction. Satisfactory improvement in the mix properties was achieved, he said, by blending the powdered asphalt with the heated aggregates.

An example of how to determine the amount of powder. If the standard paving mix contains 6.0 percent of asphalt, the added powdered asphalt should be 6.0 times 0.15, or 0.9 percent by weight of the total mix.

The Institute also has conducted some studies on mixes using asbestos fiber and other mineral fillers for very high-stability asphalt pavements. Mixes using asbestos fibers will be used in experimental bus stop paving zones in Cleveland. Mix specimens, with and without 2.5 percent of short asbestos fibers, were prepared and subjected to laboratory evaluation. The standard paving mixes produced unsatisfactory stability values but, when asbestos fibers were added, they produced satisfactory stability and flow values and desirable voids content.



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Lower layer of bituminous concrete widening is placed on US 45.

Hot-Mix Widening Placed Two Miles a Day

Just how simple and rapid an asphalt widening job can be at times was demonstrated by an 8-mile project on US 45 in northern Illinois. The 18-ft. pavement was widened to 24 ft. by constructing a strip along each side.

The contractor was Skokie Valley Asphalt Company, Inc., which took the widening and full-width resurfacing at \$899,124.

As described in the Illinois Highway Engineer, published by the Illinois Association of Highway Engineers, the preliminary work included shoulder or grade widening, culvert lengthening or resetting, and re-ditching. Then as the first step in placing the widening strip a trench was opened up along the existing pavement on the same day that bituminous mix was to be placed. This close timing minimized traffic inconvenience and hazard, and reduced the chances of saturation of the strip's subgrade by rain.



Close-up view shows Barber-Greene widening equipment at work.

The widening trench was cut by a motor grader using a template attached to the blade to control width and depth. This control was important since the contractor was not allowed any tolerance on under-thickness and also was not paid for any overage. A trench roller compacted the bottom.

The two $4\frac{1}{2}$ -in. layers of asphaltic mix which comprised the widening pavement were placed with a Barber-Greene widening machine. This unit which was self-propelled and traveled on the existing pave-

ment deposited the mix via a conveyor, hopper and adjustable gate which left a 6-in. loose depth of mix.

The first course was placed 3' 11" wide. The top layer was placed 3 ft. wide, spreading to 3' 6" during rolling. Initial compaction was by a steel wheeled trench roller, followed by two vibrating steel rollers. A hand operated heated roller was used on the outer edge to shape and compact the material along the 45 deg. slope.

Tests were conducted the same

day and 95 percent compaction was generally found. Cores of 4-in. diameter were removed with a water-cooled electric drill after rolling. A field laboratory crew ran tests and reported results the same day.

The second layer was placed the morning of the following day, and the remaining trench was backfilled with earth in the afternoon a long pavement completed that morning. The whole widening operation was thus completed in only two days, but due to the length of time required for the heavy mat to cool off and permit traffic, the portion completed in the afternoon was not backfilled and opened to traffic until the following or third day.

The length of widening constructed per day was generally about 9,000 ft. for the lower layer and 10,700 ft. for the upper. About 1,000 tons per day was placed. Due to unavoidable variations of width and depth, a slight excess of material was necessarily used. By careful control of all details of the operation, this excess was held to about 5 percent. Full width resurfacing was then placed routinely.

General superintendent for Skokie Valley Asphalt Company, Inc., was Archie Urdangan; resident engineer for the Illinois division of highways was Duray Potter.

AGC-NBCA Committee

The formation of a joint cooperative committee was announced today by the National Bituminous Concrete Association and the Associated General Contractors of America. Both have national headquarters in Washington.

At its first meeting held at Lake Kiamasha, N. Y., the NBCA-AGC Joint Cooperative Committee explored areas of mutual interest and concern to the two associations; legislation, labor, flexible pavement specifications, accident prevention and public relations.

The committee commended NBCA's current Quality Improvement Program, whose announced objectives are "a better product, better workmanship and assurance to the taxpaying public that it will receive a dollar's worth of highway for each dollar expended for that purpose."

Officers chosen by the group are D. J. O'Connell of Holyoke, Mass., AGC cochairman; J. A. Woodworth of Tacoma, Wash., NBCA cochairman; J. M. Sprouse, Washington, AGC cosecretary, and Keith Griffith, Washington, NBCA cosecretary.

Those attending the first meeting of the committee besides the officers included C. T. Stockton of Hialeah, Fla., AGC; Palmer Dauge of Whistler, Ala., NBCA, and L. L. Shertzer of Montgomery, Ala., NBCA.

The next committee meeting will be held in conjunction with NBCA's annual convention at the Shamrock Hilton Hotel, Houston, Texas, Jan. 28-Feb. 2, 1961.

296 Asphalt Kettles

The Pennsylvania department of highways has awarded Hauck Man-

ufacturing Company a contract for 296 asphalt trailer kettles, possibly the largest order for this type of equipment ever placed by a state. The kettles are tube-fired LP gas-burning type with automatic temperature control and flame shut-off. The units will be used in the maintenance of Pennsylvania's 41,000 mile state directed highway system.

W. Virginia Hot Mix Association Formed

Asphalt paving contractors have recently formed the West Virginia Bituminous Concrete Association with headquarters at Charleston and twenty-seven companies among the membership. R. C. Shepherd of Elkins Asphalt Company, Elkins W. Va., is president.



CALIFORNIA—Construction of school roads and parking lots is the principal work of G. Ferrabee Company. One of their Huber-Warco Maintainers is finish grading a road at the new Fairview Elementary School located at Lafayette, California. The company also handled the paving.



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TORQUE CONVERTER combined with 45½ H.P. gasoline engine gives plenty of power for tough-

est jobs. Converter reduces shock loads, prolongs machine life, increases work capacity and cuts fuel consumption.

WORKING SPEEDS range from 1.7 to 8 M.P.H. Travel speed is 21 M.P.H. for quick movement between jobs. Weight is 6,250 lbs.—7,205 lbs. with calcium chloride in tires.

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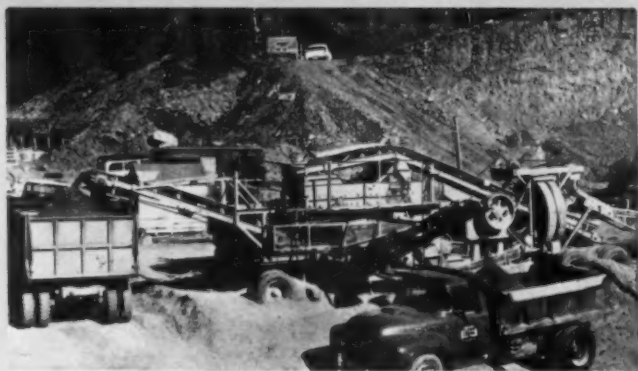
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NEW PRODUCTS

Listed here are reviews of new and improved equipment items, selected to aid our readers in purchasing. See reader service numbers on enclosed postcard.*



Koehring Equipment Show Presents New Portable Batcher, Loader

The 1960 Construction Equipment Show staged by Koehring's seven construction divisions gave contractors, distributors, and other equipment users a first look at the new Johnson Rover, a transit-mix batching plant, and the Parsons-Shawnee backhoe.

Some 40 Construction machines

built by various divisions of Koehring formed the equipment spread which was put through its paces in a variety of demonstrations and displays for the hundreds of visitors on hand each of the four days of the show. Included in the demonstration were road rolling and compaction techniques; aggregate spreading; paving and finishing methods; excavating, loading and hauling; and trenching and backfilling.

Among the other featured attrac-

tions was a complete highway set-up, which included the largest of Koehring's pavers, reported to be the largest in the world, the Tri-batch; a truck crane with a 200 ft. tubular boom; a fast front-end loader attachment for the Kwik-Mix Hi-Lift; and a variety of spreading, compacting and drilling machines.

Among the guests were people from all over the U.S., Canada and several foreign countries. About 100 representatives of press-radio-TV made the total attendance reach over the expected 2,000 visitors.

Demonstrations were set up under actual job conditions in various areas of the proving grounds, with bases set up on shuttle service to take the spectators to and from the demonstration area.

Mobile Transit Mix

A completely mobile transit-mix plant with a batching capacity of 100 cu.yd. per hr. was recently announced at the Koehring Equipment Show.

Consisting of two self-contained mobile semi-trailer units with all wiring and piping intact, the unit is 8 ft. wide and 13 ft. high, permitting highway travel. The unit's wheels remain attached during the unit's operation. The cement charging hopper and cement batcher remain attached during moves, and hinge into position over discharge hood when the plant is erected. The bin extensions and top dividers hinge down during moves and are reported to be quickly erected and pinned in place.

The bin has 3 compartments which total to a length of 21 ft. The motor controls have built-in rain-tight control panels with the master switch, fuses, full voltage magnetic starters and push buttons for each motor. Other optional equipment include: graphic recording for cement and aggregate, and digital recording for water; belt covers; and air brakes.

C. S. Johnson Co., Div. of Koehring Co., Champaign, Ill.

For more details circle 101 on Enclosed Return Postal Card.



Johnson's Mobile Batcher

*To readers outside of the United States—postal rules forbid use of business reply cards outside of the U.S. Please write to us listing the numbers, month and name of magazine, and mail with your name and address to Inquiry Dept., Roads and Streets, 22 W. Maple St., Chicago 10, Ill., U.S.A.



Slope Grader

Slope Grader

A new, Model U-16 Grade-More Slope Grader with hydraulically-controlled heel movement has been announced by Hasselbach & Sons.

The fully-hydraulic U-16 has a light touch on the hydraulic controls enabling the operator to move the heel of the big, 16 ft. moldboard up and down, as well as in and out from the side of the motor grader... to the best position for maximum unit performance. He can make continuing adjustments, to fit constantly varying conditions, while the motor grader is in motion. Another hy-

draulic control moves the blade to the degree of slope required with positive down pressure to assure a more perfect cut. The new Grade-More can be used simultaneously with the motor grader blade to provide a 24ft. blading width or to work on slope and top. The U-16 Grade-More is equipped with an independent, self-contained hydraulic system that is powered by the scarifier output shaft.

Hasselbach & Sons, 1112 Capitol Ave., Omaha, Neb.

For more details circle 109 on Enclosed Return Postal Card.



Ford's new T-850 features separate mounting of front-end sheet metal and fenders, cab and radiator for reduced vibration. The cab is reported shortened nearly 10 in. and the wheelbase is longer. V-8 engines range from 206 to 266 hp. Ford Motor Co., Box 608, Dearborn, Mich.

For more details circle 110 on Enclosed Return Postal Card.

Material Handler

An all-new all-hydraulic rubber-tired material handling crane of 5 tons capacity has been announced by Hanson Excavator & Crane Co.

The new compact crane, Model H-5 is powered by a Continental Model F-226 six-cylinder gasoline engine with a transmission offering four speeds forward and one in reverse. An Allison torque converter drive is standard equipment. The boom swings in a 360 deg. arc and telescopes hydraulically from its 10 ft. basic length to an ex-



Hanson Material Handler

tended length of 18 ft. All operations are reported independent and simultaneous. The crane travels at speeds to 20 mph. with 4-wheel hydraulic brakes and hydraulic power steering.

Hanson Clutch & Machinery Co., Tiffin, Ohio

For more details circle 111 on Enclosed Return Postal Card

Self-Leveling Loader

A self-leveling, high capacity loader has been designed for use with the International 660 tractor. The International Wagner No. 625 loader has heavy reinforced lift arms braced at bucket end to provide rigidity at full load. The unit weld tubular frame construction, bolstered with gusseted braces is said to give strength and durability. Spill back may be elimi-



International Self-Leveler

nated by the self-leveling action. With the tractor's internal system, 4,000 lb. can be raised to full height of about 13 ft.

International Harvester Co., 180 North Michigan Ave., Chicago 1, Ill.

For more details circle 112 on Enclosed Return Postal Card.

Continued on page 108



Michigan rubber-tired dozer prevents job shutdown

**Haul trucks bogged down
until Model 280 arrives
to spread fill and compact
in one operation**



Push-loading a fleet of five 15 yd scrapers, the Model 280 boils 'em over in only 45 seconds.

When a Michigan Model 280 rubber-tired Tractor Dozer was put to work on the Rieth-Riley Construction Co job near South Bend, Indiana, filling and compacting problems—which threatened to close the job—were solved.

It was early spring. This Goshen, Ind, firm was working on a \$1,000,000 contract, building part of a new four-lane divided highway to bypass South Bend. Yardage totalled 644,000 cu yds, mostly clayey sand. Trouble started when pockets of wet glacial clay were encountered at the borrow pit. Then it snowed and the material became even more unstable. The dozen 10 yd trucks hauling onto the fill were continually bogging down. A 10-ton, 3-wheel roller couldn't compact fast enough and a pair of 200 hp crawlers couldn't spread fill and pull out trucks too. The job was near a standstill.

At this point, Grade Foreman Truman "Cannonball" Condra thought it might be a "good idea" to try a mobile high-speed Michigan Tractor Dozer. Michigan Distributor, Deeds Equipment Co, brought out a 262 hp Model 280.

Michigan performs dual role

Half a day's work with the Model 280 unsnarled the tangle. The key was speed. The fast rubber-tired rig could assist trucks when they bogged down and still have time to spread material across the length and 250 ft width of the fill.

Compaction: 95% in normal dozing

Later, an even more amazing thing began to happen. As the day wore on, trucks no longer became mired in the unstable material. The Model 280 with its big hydroflated 29.5 x 29 wide-base tires and working weight of 56,000 lbs, was compacting fill so well the trucks could get through. Moreover, in the normal course of its dozing job, required compaction was being attained by the Michigan alone... compaction which

equalled the state specification of 95 to 100% Proctor.

Handles fill work too

So, trucks got through and the job was kept open. The Michigan Model 280 handled the spreading of fill and compaction for 12 trucks—3,000 pay yds per 10 hr day. The two crawlers were put on standby. Track costs, a major problem in the sandy material, were eliminated. The roller was retired.



Spreading scraper-dumped fill 500' takes the Michigan only 45 seconds. Return, in fast reverse, takes 25 seconds.

Production jobs all over the grade

In later weeks, as weather and soil conditions improved, the Michigan's versatility, power and speed paid off even more, both on additional production jobs and odd jobs. On construction of the main interchange, for instance (a fill 47 ft deep with grades up to 2 to 1), the 262 hp Model 280 dozed 5,000 pay yards per 10 hour day, per cross-section measurement. On push-loading assignment—working with five 15 yd scrapers, the Model 280 loaded each to spill-over in only

45 seconds. Spreading scraper-dumped material also took an average of 45 seconds over a distance of 400 ft. With up to 28 mph reverse, back-up "dead head" time here usually amounted to less than 30 seconds.

"Right there" for emergencies

The Michigan's 28 mph speed permitted runs from one end of the two mile job to the other for handling such emergencies as starting stalled equipment, pushing loaded scrapers over hills and pulling out bogged-down trucks. It came in handy when repair work was called for. The high blade lift made it possible to "pull out" engines and power-train components for repair, making it unnecessary to call in an A-frame truck. The Michigan also back-filled drainage structures... in less than two hours overtime it could complete 10 or 12, each structure taking only 10 to 15 minutes.

In summary, the Model 280 did production work wherever used... dozing, shaping, rough grading, compacting, push-loading. It needed no planks when traveling over railroad tracks or concrete and it could quickly run around to handle emergency situations. When the bulk of earthmoving was completed, the Model 280 was kept on to complete the finished grading before paving began.

Grade Foreman Condra put it this way, "I won't say our Michigan will do everything, but I am convinced we can't get along without it." Maybe you "shouldn't get along without a Michigan Tractor Dozer" either. Why not call us for an on-the-job demonstration. Choose from any one of four sizes—162, 262, 375, and 600 hp. No obligation.

Michigan is a registered trademark of
CLARK EQUIPMENT COMPANY
Construction Machinery Division



2497 Pipestone Road
Benton Harbor 8, Michigan
In Canada:
Canadian Clark, Ltd.
St. Thomas, Ontario



BALDERSON INSIDE DOZER

Inside Dozer

A new main frame mounted Inside Dozer for the Cat D6B tractor, for tractor jobs that require a minimum width blade, was announced by Balderson, Inc.

Model BD16 dozer is available in two styles; the regular blade with vertical cutting edges on the end plates, and the logging blade with completely open ends. Either type blade is eight ft. wide which gives legal and safe transportability. Push arms of the BD16 dozer extend between the tracks and the tractor engine, attaching to Cat ball-type trunnions that are welded to steel brackets. These trunnions brackets bolt on each side of the main frame of the tractor to give plenty of raise and dig for both cable and hydraulic controlled blades. The tracks are free to oscillate while the blade stays level with the tractor.

Balderson, Inc., Wamego, Kan.

For more details circle 113 on
Enclosed Return Postal Card.

Reflectors

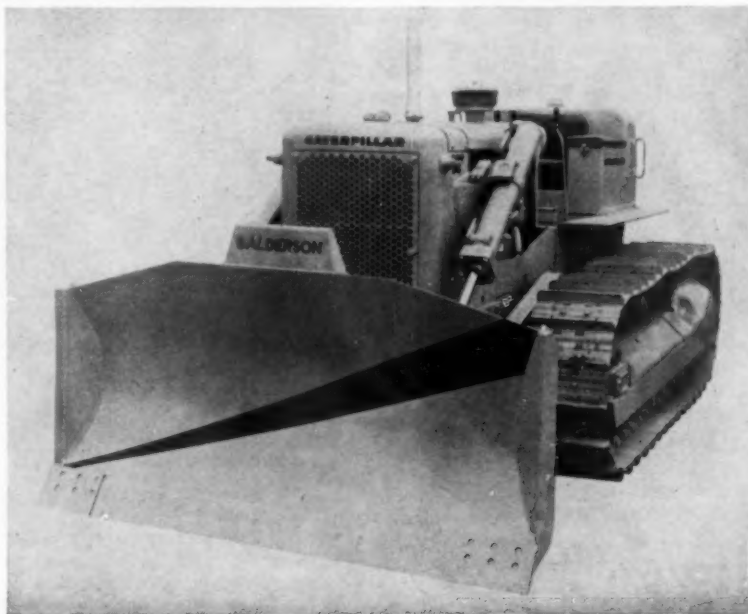
A new side-mounted crescent reflector is now being introduced by Wheeler Reflector Co.

Wheeler's new crescent reflector features easy installation and is made for a 2500 lumen output lamp. It is of modern design, made of steel with a porcelain enamel finish, and is also available in aluminum. The crescent reflector has a photocontrol receptacle in the slipfitter, and it can be pre-wired with or without the receptacle. A spe-

cial knockout plug allows insertion of the receptacle after installation.

Wheeler Reflector Co., Division of
Franklin Research and Development
Corp., Hanson, Mass.

For more details circle 114 on
Enclosed Return Postal Card.



Reported the largest unit in the 1961 Dodge Truck line, this large NC1 1000 tractor features a Cummins NH 220 diesel engine. Available in five wheelbases from 146 to 200 in., it is equipped with swing out fenders that ensure convenient engine accessibility.

Dodge, 7900 Joseph Campau, Detroit 31, Mich.

For more details circle 116 on
Enclosed Return Postal Card.

Metering Regulator

A complete line of metering regulators for oxygen, carbon dioxide, helium, nitrogen and argon, was recently announced by Harris Calorific Co.

These regulators are reported to be extremely accurate and can be mounted



Wellman Meter Regulator

in any position without affecting the accuracy of flow. There are no gaskets to loosen, causing loss of gas and erroneous reading of flow, and the gauge dial is designed to show actual flow in cu. ft. per hr. consumed. Accuracy and uniformity of flow permits a lower flow setting.

Wellman Co., Investment Insurance
Bldg., 1405 E. 6th, Cleveland 14, Ohio.

For more details circle 115 on
Enclosed Return Postal Card.

Electronic System Traffic Control

An electronic detector system for the nation's highways, operating from circuits embedded in the pavement to control traffic automatically or to count passing vehicles, has been announced by the Radio Corporation of America.

Named RCA Ve-Det (Vehicle Detector), the system is an immediate application of the techniques used in the electronic highway system recently publicized.

The all-transistor RCA Ve-Det system employs a wire loop buried in the roadway surface. When a vehicle passes over this loop, a signal is received by the portable detector, a unit measuring only 4 by 5 by 7 inches, which can be moved to any wire loop installation in a highway system. Two detectors can operate from the same dimensions as the detector itself.

The detector may be connected with a counting device, traffic signal controller, traffic warning light, turnpike toll booth indicator, or to an automatic garage door opener.

Radio Corp. of America, 30 Rockefeller Plaza, New York 20, N.Y.

For more details circle 117 on Enclosed Return Postal Card.

Rock Drill

A new all-purpose, medium weight rock drill has been announced by Davey Compressor Co.

Known as the Davey-Holman Silver Bullet, it is said to combine excellent drilling performance with extremely low air consumption. Features include g-way throttle controlling on-off-blow



Davey Rock Drill

from operating position. A lubrication system automatically supplies all working parts, including chuck with oil. Net weight of the Silver Bullet, with 1 x 4 1/4 in. chuck, is 58 lb. It is 23 3/4 in. long. Due to its high output working capacity, it is claimed that the tool can be used for drilling both primary and secondary blast holes to 18 ft. depth.

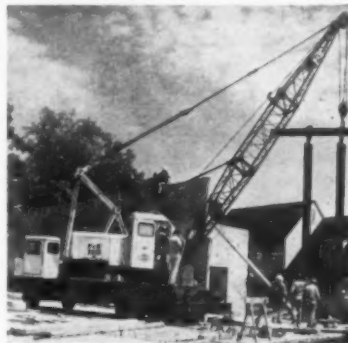
Davey Compressor Co., Kent, Ohio

For more details circle 118 on Enclosed Return Postal Card.

20 Ton Truck Crane

A new 20-ton-capacity truck crane has been developed by Harnischfeger Corp. of Milwaukee.

Labeled a P&H Model 255B-TC truck crane, the new machine is said to safely handle booms and jib extensions up to 140 ft. in length. When equipped with a maximum 110-ft. boom and 30 ft. jib extension, the new P&H is reported capable of delivering a 5,500 lb. load 12 stories above ground, or positioning 4,300 lb. loads 60 ft. away. Among features contributing to this 25-ton performance was said to be pow-



Harnischfeger Truck Crane

er Box design. This design has the main gear housing built as an integral part of the machine. All major gears in the crane portion of the unit are sealed inside to deliver maximum efficiency, yet remain trouble-proof from a maintenance standpoint. These gears in their sealed housing are said to require change of oil only once a year. The new unit can readily be equipped with a dragline bucket, clamshell bucket, or pile driver—all using the standard 40 ft. boom used for hoisting work. The front-end crane attachment can be replaced quickly with a backhoe attachment which digs to depths in excess of 21 ft. A shovel attachment is also available.

Harnischfeger Corp., 444 W. National Ave., Milwaukee 16, Wis.

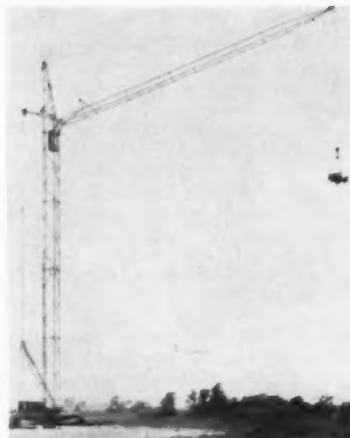
For more details circle 119 on Enclosed Return Postal Card.

Tower Crane

A new electric powered Tower Crane—the first American-built machine of its type—has been developed by Bucyrus-Erie Co., South Milwaukee, Wis., for use on major construction projects.

Designated the Mark 1-50, the Bucyrus-Erie Tower Crane is designed to handle building-construction crane applications with a marked reduction in labor and material handling costs. It offers a combination of extreme lifting height and reach with high line speed and mobility on rails. With its flexible, building-height tower and 60 to 120 ft. boom lengths, it provides both vertical and horizontal lift-ability in one continuous cycle.

All four basic functions of this materials handling giant—swing, load hoist, boom hoist, and propel—can be



B-E Mark 1-50 Tower Crane

operated independently or simultaneously. The operator can position his cab in the tower at a level providing best visibility of the work area.

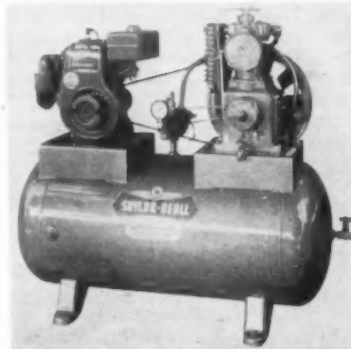
Bucyrus-Erie Co., South Milwaukee, Wis.

For more details circle 120 on Enclosed Return Postal Card.

Truck Mounted Air Compressor

A new 8 hp. air compressor designed for mounting on a light pick up or panel truck has been introduced by the Saylor-Beall Mfg. Co.

Designated the UL-743-ES, it is suggested for tire service when mounted on a pick-up or wrecker and can be used for other services operations such



Saylor-Beall Compressor

as greasing, tire changing or to operate pneumatic tools. This unit is a two stage gasoline engine driven 2 stage compressor complete with 30 gallon tank and equipped with a centrifugal unloader for loadless starting and designed for continuous operation. It has a maximum pressure of 175 lb. with a displacement of 23.8 CFM and is also available with 60, 80, and 120 gal. tanks. It may be equipped with an electric starter, belt guard and oil bath air filters.

Saylor-Beall Mfg. Co., St. Johns, Mich.

For more details circle 121 on Enclosed Return Postal Card.

Truck/Tractor Series

A new V 8 truck and tractor series with a 90 in. bumper-to-back-of-cab measurement was recently announced by Reo Div. of the White Motor Co. All models in the D 600 and D 700 series are powered by Reo's Gold Comet V-8 gasoline engines.

The series consists of six models: two single axle tractors with GCW ratings of 65,000 and 78,000 lb.; two tandem axle tractors with GCWs of 70,000 and 78,000 lb.; and two tandem truck models with GVW ratings of 42,000 and 52,000 lb. respectively. Each of these models is powered by a Gold Comet OV 207 hp. V-8 engine with the Gold Comet OV-235 hp. available as an option. The 90-in. bumper-to-back-of-cab measurement reportedly permits the tractors in this series to haul 40 ft. sq. nose trailers within 50 ft. legal limits. Designed specifically for over-the-highway operations, the



Reo's New Tractor

standard tractor wheelbases are 134-in. with a CA dimension of 72 in. Standard wheelbases on the tandem truck models are 158-in. Standard transmissions are the Fuller 5A65 in the single axle tractor and tandem trucks, while the Fuller R-46 is standard in the tandem tractor models, D 633 and D 733. Optional transmissions include the Fuller 5 AW65A and the Spicer 6352 as well as Reo-Matic drive.

Reo Div., White Motor Co., Lansing, Mich.

For more details circle 122 on Enclosed Return Postal Card

Batching Console

A remote console, the Selectron, for batching concrete in the dispatcher's office 160 ft. from the batch desk was recently announced by Noble Co.

Ten different pre-set formulas of 7



Noble's Selectron

different materials are remotely batched by this compact unit. Batch tickets with complete written instructions as to formula, batch size and other specifications are provided. This avoids errors of misinterpretation possible when instructions are given over an intercom system.

With the batching console in the dispatcher's office, electrical parts are removed from the usual dust and dirt of the batch deck and equipment maintenance can be reduced.

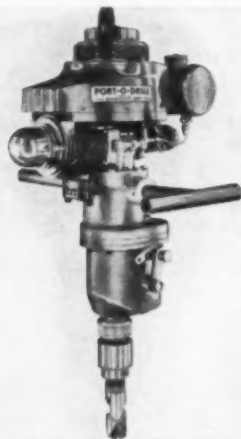
Noble Company, 1860 7th St., Oakland, Calif.

For more details circle 123 on Enclosed Return Postal Card

Portable Drill

A new Port-O-Drill, powered by a self contained 2.2 hp. 2 cycle air cooled gasoline engine with a pressurized fuel tank, has been announced by Schnaske Mfg. Corp.

It may be used continuously at any angle of operation, indoors and outdoors, completely independent of any auxiliary power sources. Total weight of the Port-O-Drill is only 30 lbs., with an overall height of 24 in. This



Port-O-Drill

allows the tool to be easily handled by one man in nearly any position desirable. A recoil starter permits easy, rapid starting and a shielded spark plug cover provides protection against shock.

Schnaske Mfg. Corp., 1016 E. Columbia St., Evansville 7, Ind.

For more details circle 124 on Enclosed Return Postal Card

Injector Cups

A new Accroloy injector cup to be used with the exclusive Cummins PT fuel system was recently announced by Cummins Engine Co., Inc.

The combination of high percentages of chromium and nickel in the accroloy cups is said to resist erosion and any corrosive action which may act on injector cups. The accroloy cup does this by building up a hard oxide film. By reducing the amount of fuel retained in the cup after injection, carbon formation is lowered, resulting in less plug-

ging of cup spray holes. Frequent cleaning is reported to be no longer necessary.

Cummins Engine Co., Inc., Columbus, Ind.

For more details circle 125 on Enclosed Return Postal Card

Tractor Shovel

The newest addition to the Trojan line of tractor shovels, the Model 254, is now reported in production. With 15,000 lb. lifting capacity and bucket sizes from 2 to 3 cu. yds., the new Trojan Model 254 is designed primarily to fill the gap between Trojan Models 204 in the 12,000 lb. class, and 304 in the 18,000 lb. class.

Such features as full power shift transmission, planetary axels, power



Trojan Tractor Shovel

steering, and four wheel air powered hydraulic brakes permit operators to reach maximum production. A complete line of attachments give the Model 254 job flexibility. Road speed of 24 mph. permits fast moves from one job to another. Trojan's lift arms give maximum protection to the operator, while the extra wide tread and longer wheelbase provides stability under difficult working conditions. Both gasoline and diesel operation is available through three engine options. A fully adjustable bucket seat, lights, and complete panel instrumentation are provided as standard equipment.

Trojan Div., Yale & Towne Mfg. Co., Batavia, N.Y.

For more details circle 126 on Enclosed Return Postal Card

Snow Plow

A new snow removal machine, called the Homko Snow Husky, has been introduced by the Western Tool and Stamping Company.

The new 15 in. snow plow, model 5342 is an all-steel auger-type snow gatherer and expeller with a 2-way chute which is adjustable for throwing snow right of left up to 20 ft. away, and up to 10 ft. high. The Snow Husky has a 2 1/2 h.p. Briggs & Stratton engine with recoil starter, heated carburetor and shielded spark plug. The engine is completely enclosed to eliminate freezing of gas lines, starting mechanism and other vital parts. The fingertip throttle provides stand-up control of the engine speed, and the Husky's 8 in. rubber-tired wheels on a solid axle affords sturdiness.

Western Tool & Stamping Co., 2725 2nd Ave., Des Moines 13, Ia.

For more details circle 127 on Enclosed Return Postal Card



Vibrating shoes consolidate fast, deep for profitable single-course construction!

100% consolidation of subbase materials is often possible in only one pass with a Lima Roadpacker. High-speed vibrating action fills voids, keying materials to depths of 12 in. and more.

Fewer courses, passes

Single-course construction with a Roadpacker is more profitable, because you need lay fewer courses and make fewer passes than with less efficient consolidation equipment.

Working widths can be varied up to 13 ft., 1 in. End shoes fold up for highway travel at speeds to 30 mph. Roadpacker works at speeds from 20 to 95 fpm; consolidates up to 600 tons per hour. Works forward or in reverse, never shoves material. Self-propelled; gasoline or diesel engine. Easy to operate; good visibility. Optional widener

attachment is available to replace trench rollers.

Lima Roadpackers are easy to maintain. Hydraulically operated vibratory shoe mechanisms are completely sealed from abrasive dust; maintenance free.

Super model available

Lima also offers a new 12-shoe *Super* Roadpacker for extra-high-production consolidation on large construction jobs such as superhighways, air bases and earth-fill dams. It has more than double the consolidating capacity of any multiple shoe vibratory machine!

Learn more about the profit-making features of Lima Roadpackers. See your nearby Lima distributor today or write to Construction Equipment Division, Baldwin-Lima-Hamilton Corporation, Lima, Ohio.



MODEL D ROADPACKER—International favorite for high-speed, high-production consolidation on highway and airport construction.



NEW 5-YD. LIMA LOADER digs, scoops, swings and loads from stationary position; no waste motion. Fast, economical way to handle bulk materials.

DISTRIBUTORS IN PRINCIPAL CITIES OF THE WORLD

... for more details circle 283 on enclosed return postal card

LIMA Construction Equipment Division, Lima, Ohio
BALDWIN • LIMA • HAMILTON

Shovels • Cranes • Draglines • Pullshovels • Roadpackers • Crushing, Screening and Washing Equipment

6024



don't let this happen on your roads...



Photo courtesy Bureau of Public Roads, Dept. of Commerce

Icy roads like the one above are quickly changed to safe, bare pavements with Columbia Calcium Chloride-rock salt mixtures.

CLEAR ICY PAVEMENTS FAST with Columbia Calcium Chloride-rock salt mixtures

No other ice and snow control material offers these Columbia Calcium Chloride-rock salt mixture advantages:

BARE PAVEMENT FASTER: Test results (right) prove the ice melting action of Columbia Calcium Chloride-rock salt mixtures. And, mixtures give you a uniformly clear pavement, free from treacherous patches of ice.

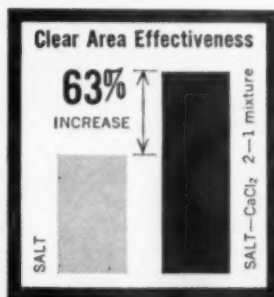
ALL-TEMPERATURE EFFECTIVENESS: Columbia Calcium Chloride-rock salt mixtures assure quick melt at *all* temperatures—from freezing to sub-zero.

SAVE TIME, MONEY: Columbia Calcium Chloride and rock salt mix easily, can be stored indefinitely, ready for instant use with minimum shelter required. Bulk purchase and storage help stretch maintenance budgets.

It isn't too late to order your Columbia Calcium Chloride and rock salt. Get your order in now to keep your roads safe this winter.

For more information write to our District Sales Office nearest you or to our Pittsburgh Address.

Clear pavement area two hours after application of calcium chloride-rock salt mixtures is 63% greater than salt alone in 25-30° temperature range. (Based on field studies in Michigan sponsored by the Calcium Chloride Institute)



You'll like doing business with Columbia-Southern

**columbia | southern
chemicals**

COLUMBIA-SOUTHERN CHEMICAL CORPORATION • A Subsidiary of Pittsburgh Plate Glass Co., One Gateway Center, Pittsburgh 22, Pa.
DISTRICT OFFICES: Cincinnati • Charlotte • Chicago • Cleveland
Boston • New York • St. Louis • Minneapolis • New Orleans • Dallas
Houston • Pittsburgh • Philadelphia • San Francisco
IN CANADA: Standard Chemical Limited

... for more details circle 291 on enclosed return postal card

Swing the **LOAD** instead
of the **LOADER!**



180° SPEED SWING

ALL-PURPOSE MATERIAL HANDLER

The Pettibone 180° Speed Swing answers every need on your job schedule because it combines the best features of all material handling equipment in *one* machine. This gives you *all-job versatility*, plus exclusive swinging boom performance.

The turning and maneuvering requirements of conventional loaders are now eliminated by the Pettibone Speed Swing because you swing the load instead of the loader! This means *faster, safer, more efficient* handling!

It cuts your time and labor costs.

You eliminate the need for extra equipment investment, all of which adds up to a more profitable operation for you!

Shown above the Speed Swing is working parallel to the shoulder and dumping material over the bank. This eliminates the possibility of the loader tumbling over the bank and endangering the operator. Shown at right, 10 quickly interchangeable attachments (by changing *only 3 pins*) make the Speed Swing the *most adaptable, most versatile* all-purpose material handler today!

Get the facts on how the Pettibone 180° Speed Swing can reduce your equipment investment, as well as your maintenance costs.

PETTIBONE MULLIKEN CORPORATION

4700 W. DIVISION ST.

CHICAGO 51, ILLINOIS

SPaulding 2-9300



New Products

Warning Flasher

A transistorized highway safety light suitable for mounting on saw horses and barricades is now available from the Fisher-Pierce Co.

The Safe-T-Flash produces timed flashes through a 7 in. amber colored plastic lens that is scientifically designed for maximum brilliance. It operates continuously at a choice of two flash rates and flash durations; the Model 1751A produces 175 flashes per minute, 55 milliseconds duration; the Model 1751B produces 67 flashes per minute, 110 milliseconds duration. The lens and battery case of the Safe-T-



Safe-T-Flash Light

Flash form a one-piece enclosure of amber-colored high-impact Tenite Butyrate plastic that will not shatter or crack under normal use. Further protection from damage is provided by a corrosion-resistant steel housing with a heavy duty catch. The lamp and sealed-in transistor circuit are included in the shock-and vibration-resistant Flash Pak which is easily attached to a 6 volt battery.

Fisher-Pierce Co., 170 Pearl Street, So. Braintree 85, Massachusetts

For more details circle 128 on Enclosed Return Postal Card.

60 Cycle Vibrator

A new high amplitude 60 cycle motor in-head vibrator has recently been put on the market by Stow Co. This model YUA vibrator can speed up vibrating in stiff concrete, states Stow.

The YUA has a universal motor built into the vibrator head and operates on 115 Volt AC or DC, 25 to 60 cycle. It vibrates at from 12,000 to 15,000 vibrations per min. Wear resistance casing which covers the electric wires and acts as a handling-hose is available in 7 ft., 14 ft., or 25 ft. lengths. A completely covered off-on switch 7 ft. from the 2 3/4 in. dia. head, and a thermal overload switch are also available.

Stow Mfg. Co., 65 Shear Street, Binghamton, N.Y.

For more details circle 129 on Enclosed Return Postal Card.

Transtar Series

A new medium and heavy duty Studebaker series includes the one ton, 1 1/2 to 2 ton and the 2 ton heavy duty models.

One ton models have a 9,000-10,000 lb. GVW rating. The 1 1/2-ton models have 15,000-18,000 GVW ratings, with the 259 cu. in. power plant standard and the 289 cu. in. engine optional. These models have four-



Studebaker Transtar

speed transmissions as standard equipment, with five-speed, direct or over-drive, transmissions available optionally. The heavy duty models are powered by Torque Star 289 cu. in. V-8 engines that develop 210 h.p. at 4,500 r.p.m. Heavy duty four speed transmissions are standard, with five speed transmissions optional.

Studebaker-Packard Corp., South Bend, Ind.

For more details circle 130 on Enclosed Return Postal Card.

Diesel Compressor

A new Cummins diesel-powered 600 c.f.m. rotary compressor has been announced by Davey Compressor Co., Kent, Ohio.

Known as Model 600 RP, the unit is available in both skid and 4-wheel



Davey Diesel Compressor

trailer mountings. Engine is a Cummins model HRS-6-B1 of 763 cu. in. size. Dimensions of the 4-wheel trailer are length 141 in., width 79 in., height 92 in., weight is 8,800 lb. The compressor is equipped with patented Davey "Perma-Vane" blades.

Davey Compressor Co., Kent, Ohio

For more details circle 131 on Enclosed Return Postal Card.

Hard Facing Electrode

For reclaiming such equipment as large sprockets, churn drills, drive tumblers, tractor grousers and most wearing parts subject to severe impact and abrasion, the new manual electrode Stoddy 1105, is reported to have

shown unusual results in extensive field tests.

This hard-facing rod is manufactured by extruding an iron powder coating containing chromium, manganese, molybdenum and vanadium on a mild steel core wire. Welding characteristics, AC or DC, are accomplished with smooth arc action, low spatter and a slag covering readily removed, hot or cold. The rod is applied as stringer beads, in weaving passes or it may be dragged. The electrode can be applied to carbon alloy steels but is not suitable for welding on manganese steel or cast iron.

Stoddy 1105 is produced in 5/8 in. and 3/4 in. diameters, 14 in. length, and 1/4 in. dia., 18 in. length. It is packaged in 50 lb. cartons.

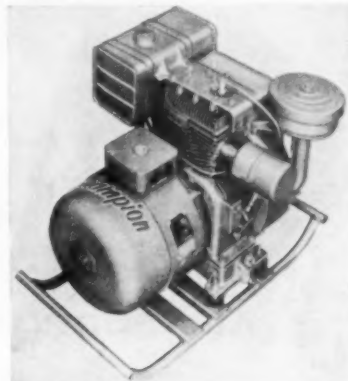
Stoddy Co., Whittier, Calif.

For more details circle 132 on Enclosed Return Postal Card.

Portable Generators

The addition of 60 cycle and 180 cycle portable generators has been announced by Champion Manufacturing Company.

Sixty cycle Champion generators range in watt rating from 1000 to 3500.



Champion Portable Generator

They are single phase, 115 volt, AC generators with two outlets. The 2500 watt, 180 cycle generator has two 230 volt 3 phase outlets and two 115 volt D.C. outlets. It features an automatic idle used when tools are not in operation.

Champion Mfg., Co., 3700 Forest Pk., Ave., St. Louis, Mo.

For more details circle 133 on Enclosed Return Postal Card.

Speed Reducers

A redesigned and expanded line of "balanced design" parallel shaft speed reducers available in 57 sizes was recently introduced by Link-Belt Co.,

With 23 new sizes added to the line, drive selections can now be matched more closely to horsepower requirements. Single, double and triple reduction units are available in capacities up to 2,800 h. p. at high or low output speeds and ratios up to 292:1

Continued on page 117



CLEVELAND DIGS SHALE AND ROCK 3-5 FT. DEEP FOR HIGHWAY DRAINAGE

THE JOB: 20 miles of drainage trenching in both inner and outer shoulders of five miles of dual highway for the relocation of U. S. Route 25 near Middletown, Ohio.

CONDITIONS: trench to be cut to grade, 18 inches wide, 3 or 5 feet deep depending on inner or outer shoulder, through very densely compacted shale and rocky material, further densified because much of the grade carried hauling equipment all through a winter, spring and summer.

PERFORMANCE: despite need to replace worn bucket teeth more frequently than usual because of the tough digging, a Cleveland J-40 dug the trench to accurate grade at the rate of 1,800 to 2,000 feet per 9 hour day.

J-40 FEATURES

- Stability—on wide-spaced crawlers, 1000-hour-lubricated
- 100% control of every operation at the operator's seat
- V conveyor for faster, higher, more efficient spoil discharge
- Pulley-enclosed dual, independent, conveyor drive
- Automatic conveyor shifting from side to side
- Over 30 non-slipping digging speeds
- Digs trench 17½ to 30 inches wide, down to 5½ feet deep.



WRITE TODAY for Bulletin L-110, a detailed report on the performance of the J-40 on this tough highway drainage job.



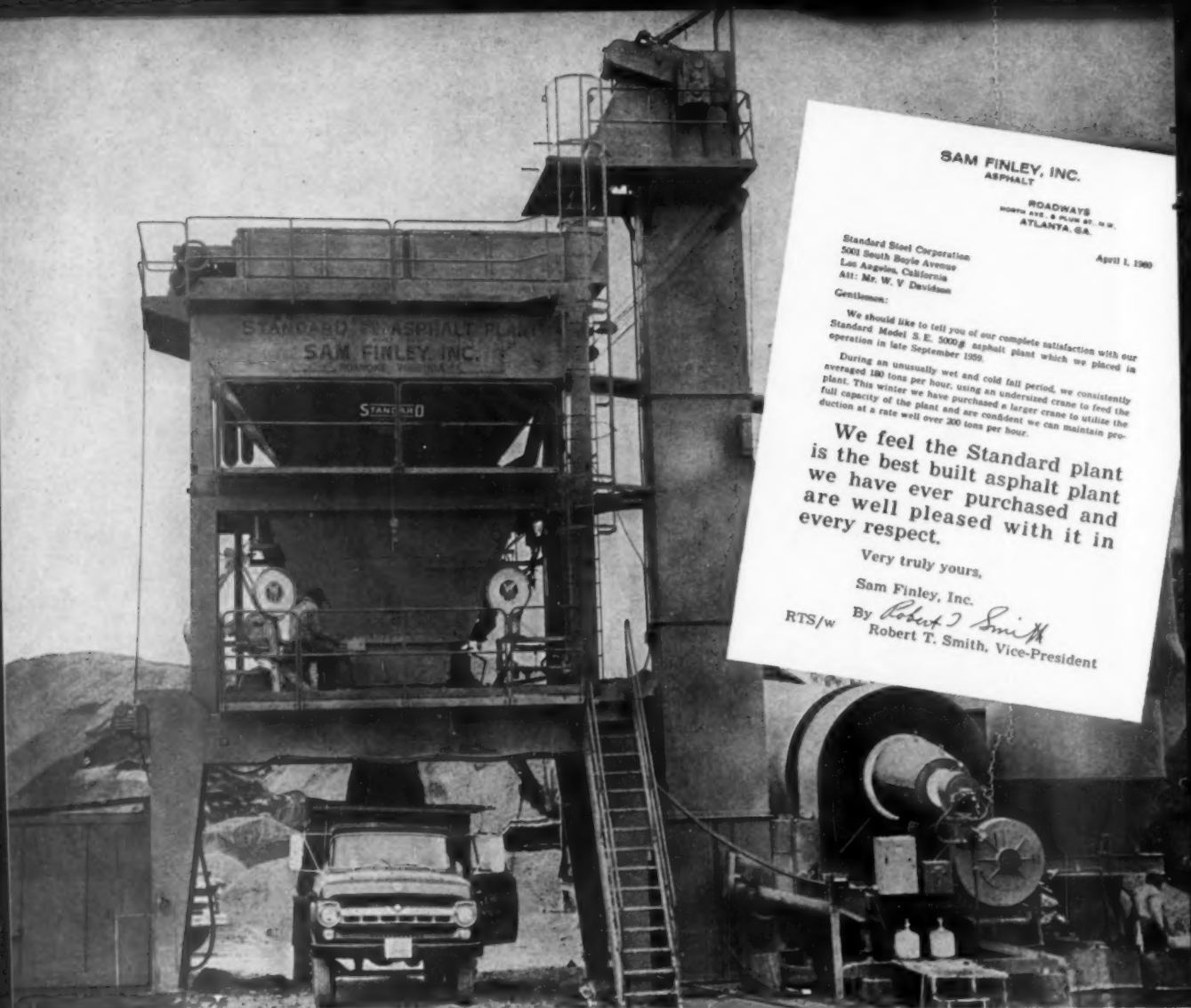
CLEVELAND TRENCHER

THE CLEVELAND TRENCHER CO., 20100 ST. CLAIR AVE., CLEVELAND 17, OHIO

ROADS AND STREETS, November, 1960

... for more details circle 290 on enclosed return postal card

113



SAM FINLEY, INC.
ASPHALT

ROADWAYS
NORTH AVE. & PLUS ST. N.W.
ATLANTA, GA.

April 1, 1960

Standard Steel Corporation
5001 South Boyle Avenue
Los Angeles, California
Attn: Mr. W. V. Davidson

Gentlemen:

We should like to tell you of our complete satisfaction with our Standard Model S-E 5000 asphalt plant which we placed in operation in late September 1959.

During an unusually wet and cold fall period, we consistently averaged 180 tons per hour, using an undersized crane to feed the plant. This winter we have purchased a larger crane to utilize the full capacity of the plant and are confident we can maintain production at a rate well over 200 tons per hour.

We feel the Standard plant is the best built asphalt plant we have ever purchased and are well pleased with it in every respect.

Very truly yours,

Sam Finley, Inc.

By *Robert T. Smith*
Robert T. Smith, Vice-President

RTS/w

SAM FINLEY, INC. says:

"BEST ASPHALT PLANT WE HAVE EVER PURCHASED"

This revolutionary new STANDARD Model S-E 5000 pound self-erecting, self-contained fully portable Asphalt Plant can be wheeled to the job-site, completely set up *without the use of a crane*, and producing hot mix within 48 hours! Manufactured in 4000, 5000, and 6000 pound batch capacities.

PUSH BUTTON ERECTION — Entire mixing unit is *automatically* raised into operating position.



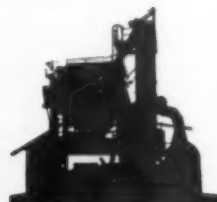
STANDARD / Complete line of Asphalt Plants
2000 through 8000 pound capacity.



Model T-M • Trailer-mounted, self-contained.



Model R-M • Semi-portable and stationary.

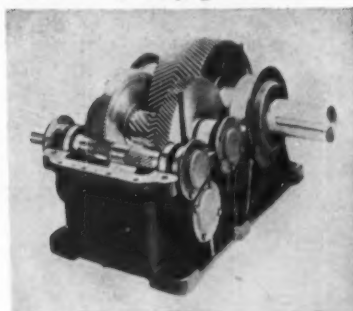


Model S-E • Self-erecting, fully portable.

STANDARD STEEL CORPORATION Manufacturers of: Asphalt Plants • Rotary Dryers • Kilns • Coolers • Cryogenics
GEN. OFFICES AND PLANT: 5003 BOYLE AVE., LOS ANGELES 58, CALIF. • MIDWEST OFFICES AND PLANT: DECATUR 3, ILL. • EASTERN OFFICES AND PLANT: LOWELL 3, MASS.
... for more details circle 320 on enclosed return postal card

New Products

Continued from page 114



Link-Belt Speed Reducers

Shafts can be arranged to suit specific drive requirements, and design permits assembly with single shaft projections in either direction or with double shaft projections. The new line includes single reduction units in seventeen sizes with ratios up to 9.78:1 and capacities to 2,800 h.p.; double reduction in twenty sizes with ratios from 11.4:1 to 70.6:1 and capacities to 1,700 h.p. and triple reduction in twenty sizes with ratios from 31.4:1 to 292:1 and capacities to 900 h.p. Literature is also available.

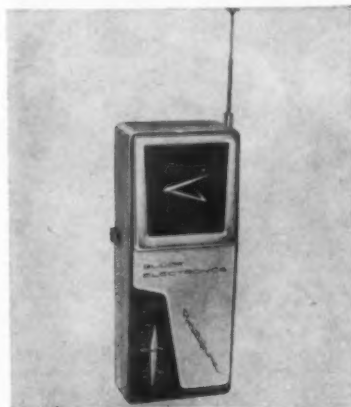
Link-Belt Co., Dept. P.R., Prudential Plaza, Chicago 1, Ill.

For more details circle 134 on Enclosed Return Postal Card.

Miniature Two-Way

A new two-way pocket-sized radio is being manufactured by Globe Electronics, a Division of Textron Electronics, Inc.

Called the "Pocketphone", the little 1½ in. x 2¾ in. x 16¼ in. hand radio is reported to broadcast and receive at distances up to one mile in the citizens broadcast band. No license of any kind is required to operate it, states the manufacturer. The transistorized device is 100% portable with built-in "Power-Pak" battery that may be recharged and is said to last up to one year without replacement. Microphone and speaker are built in and



Globe Pocket Two-Way

a retractable antenna may be extended for broadcasting. These units are used in pairs or with another member of the globe citizens broadcaster family; —the CB-100 or CB-200. It weighs 13½ oz.

Globe Electronics, 22 South 34th St., Council Bluffs, Iowa

For more details circle 135 on Enclosed Return Postal Card.

Steel Tape

The new Spencer Model 850 automatic 50-ft. steel tape is now available to industrial users.

Rewinding is said to be fast and fully automatic. Gears are steel with hardened pinion and spindle. Spring is 146 in. with overriding clutch on the hub. White enameled steel tape is marked in both ft. and 16-in. centers. Working parts of mechanism are protected by closed aluminum housings. Tape reel is open, so that mud and dirt cannot accumulate or clog the action.

Spencer Production & Sales, Dept. B-3, Pullman, Wash.

For more details circle 136 on Enclosed Return Postal Card.

Sliding Choker Hook

A new sliding choker hook is now being manufactured by the Crosby-Laughlin Division, American Hoist & Derrick Co.

The sliding choker hooks are drop forged and heat-treated for strength, have a wide throat to accommodate



Crosby-Laughlin Choker heavy thimbles and are said to be load-rated for safety. The sleeve and eye are designed for free movement on the wire rope, allowing quick, smooth adjustment for sizes of loads. It is light in weight and is available in four sizes, with a safe working load capacity ranging from 2,500 to 8,000 lbs.

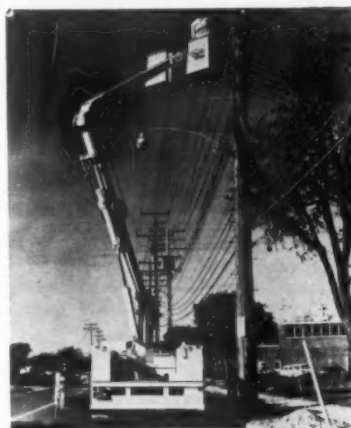
Crosby-Laughlin Division, Box 570, Fort Wayne, Ind.

For more details circle 137 on Enclosed Return Postal Card.

Insulated Aerial Elbow

A new safety factor for the men who man aerial elbows used in electrical construction and line maintenance work is now being introduced by the Holan Corp. of Cleveland.

The Holan Elbow is now being offered with a Duracor reinforced plastic structural member insert in the upper arm for insulation. Duracor is a product of the Celcote Co. Working up to 55 ft. in the air, linemen in direct contact with high voltage wires are insu-



Holan Insulated Aerial Elbow

lated from the ground by the Duracor reinforced plastic insert. Fabricated with flexural strength of 38,000 psi, the lightweight Duracor insert also serves as an integral component of the elbow structure.

The Celcote Co., 4832 Ridge Rd., Cleveland 9, Ohio

For more details circle 138 on Enclosed Return Postal Card.

Lightweight Pump

A recently announced 90M pump, manufactured by Carver Pump Company has 6 in. suction and discharge



Carver Pump

connections and is light weight and compact for easy moving. Equipped with a 37 hp. air-cooled engine the device is said to produce high efficiency with low operating cost. It is available with electric start, base or wheel mounted.

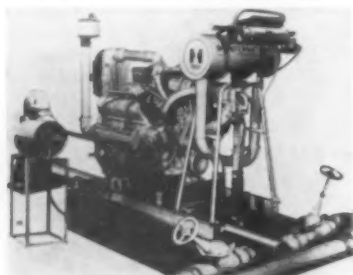
Carver Pump Co., Muscatine, Iowa

For more details circle 139 on Enclosed Return Postal Card.

Automatic Oil Regulator

Automatic oil level regulators are now available from Ren, as installation kits for International carbureted irrigation and oil field engines, it is announced by International Harvester Co.

The oil level regulator maintains the correct oil level in the crankcase, delivering from a separate supply tank at



Ren Oil Level Regulator

or near the engine, only the amount of oil required by the engine. Engine damage caused by manual overfilling or underfilling of crankcases may be eliminated through use of the regulator, as well as the labor involved in frequent oil level checkings. Supply tanks and stands are available in 15, 30 and 55 gal. sizes.

International Harvester Co., 180 North Michigan Avenue, Chicago, Ill.

For more details circle 140 on Enclosed Return Postal Card.

Power Fastening Tool

A new power fastening tool for fastening into dense material such as concrete was recently announced by Hilti, Inc., of Stamford, Conn.

Developed by that company, the DX-100-L was designed to answer the needs for safe, fast fastenings, and is said to provide safety features that eliminate the hazards of ricochet, fish hooking and explosive spall. The new tool starts the fastener in contact with the material and then pushes it in.

Hilti, Inc., 73 Southfield Avenue, Stamford, Conn.

For more details circle 141 on Enclosed Return Postal Card.

Minuteman Portable Drill

A compact, multi-purpose, rotary unit designed for subsurface exploration and production drilling in soils, rock and concrete, was announced by Mobile Drilling, Inc.

Engineered from lightweight, high tensile alloys, the Minuteman, as it is known, features big rig rotary drive for drilling capacity and versatility. It is reported to handle continuous flight augers from 3 in. to 12 in. in diameter and drives 6 in. diameter augers to 30 ft. depths. When equipped for core drilling, it drives "EW" core barrels to 200 ft. When equipped for masonry drilling, the Minuteman cuts 1 in. to 8 in. dia cores from steel reinforced concrete in standard lengths required for quality control testing. As a pro-



Mobile's Minuteman

duction boring rig it also permits fast, economical erection of fences, guard rails, parking meters and similar installations. In addition, the Minuteman handles standard soil sampling tools. Weighing 150 lb., it features a 6 HP. engine, 8 speed automotive transmission, diaphragm-type carburetor, 44 in. stroke with power or hand feed both in and out of the hole, wheel mounted base for easier handling and two point anchoring for stabilization in soils or concrete.

Mobile Drilling, Inc., 960 N. Pennsylvania St., Indianapolis 4, Ind.

For more details circle 142 on Enclosed Return Postal Card.

POT HOLES PUTTING HOLES in your BUDGET?

SAVE TIME, MONEY
and LABOR with

KOTAL
All Weather
Processed Bituminous
STOCKPILE MIX



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WINTER
WEATHER IS
HARD ON ROADS

Repair them now and keep them repaired through the winter with Kotal processed stockpile mix.

For information regarding your nearest producer or franchise areas available — write to

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119 Summit Avenue • Summit, N. J. *Company*

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DON'T THROW AWAY CRACKED DIESEL CYLINDER HEADS

You can save 50% of replacement cost with Factory Rebuilt Swick-Guth Heads. Swick-Guth restores cracked or worn heads, blocks, transmission cases to a Guaranteed good as new condition by the Controlled Heat Process... successfully used for more than a Quarter Century.

GUARANTEED TO YOUR SATISFACTION



Send today for price list and a free booklet on the famous Swick-Guth Process, and the name of the dealer nearest you.

SWICK-GUTH CO.
McPHERSON KANSAS FORMERLY GUTH CO.

"SPECIALISTS IN WELDING"

DIESEL CASTINGS"

... for more details circle 321 on enclosed return postal card

Retracting Balance Reel

Designed for the suspension of electrical and non-electrical devices and tools, Cordomatic automatically retracting balance reels keep within arms reach unwieldy air hose, paint sprayer equipment and tools of all kinds.

Model 700BR is an electric automatically retracting balance reel with Underwriters' approved grounding type



Tool Suspension Device

electric reel assembly. It is said to eliminate the need for a separate wire cable from which to suspend electrical tools. It is available with or without a twist-lock connector permitting multiple tools use. It requires no junction box or installation expense.

Model 700 CR is a cable automatically retracting balance reel suitable for suspension of electrical and non-electrical devices and ideal for use with unwieldy air hose extensions or small tools, as well as heavier portable electrical tools. Additional features include self-lubricating oilless bearings; heavy gauge steel reel housing finished in mar-resistant black vinyl and chrome. Cable tension can be adjusted from 0 to 10 lbs. to compensate for the weight of the tool or device.

Cordomatic, 17th E. Indiana Ave., Philadelphia 32, Pa.

For more details circle 143 on Enclosed Return Postal Card.

Pick-up Line

Many improvements and redesign features were recently announced by Chevrolet.

New cab features emphasize a lower and narrower floor tunnel on most light-duty models to help improve foot and leg room. New optional equipment



Chevy Pick-up

includes a windshield wiper washer combination with a 2 speed electric wiper. Air brake compressor assemblies for the air-hydraulic and full air brake systems are modified to increase reservoir pressure. The 261 cu.in. and 283 cu. in. engine cylinder heads are reported to have been removed by increasing the chrome content of the metal. The 1960 design is continued in the 61 trucks.

Chevrolet Motor Div., General Motors Bldg., Detroit 2, Mich.

For more details circle 144 on Enclosed Return Postal Card.

Break-Resistant Blade

The Clipper Mfg. Co. of Kansas City announced a new addition to their series of Blue Bond Break-Resistant abrasive blades, the MR 926.

The new Clipper specification features Leno-Weave fiber glass reinforcing, a patented manufacturing process that scientifically weaves layers of flexible glass cloth into each blade. The reinforcing reportedly is used in concrete structures to insure adequate strength. The Silicon Carbide particles flow through the reinforcing mesh, protruding beyond its surface. This protects the fiber glass cloth from becoming thin from side wear. The original break-resistant qualities are maintained through the entire life of the blade.

The Clipper Manufacturing Company, 2800 Warwick, Suite 198, Kansas City 8, Mo.

For more details circle 145 on Enclosed Return Postal Card.

Moisture Density Instruments

Four new instrumentation systems for industrial processes were recently announced by the Nuclear Chicago Corp. The new instruments, which will be marketed under the name, "Qualicon" Systems, are designed for continuous measurement and control of moisture and density of materials on conveyor belts, in pipes, in bins and hoppers, and in tanks, mixers and blenders.

The four new systems provide measurement and control of: the bulk density of solid materials either on a conveyor belt or in a bin or hopper (Model 502); the percent moisture of solid materials on a belt or in a storage facility (Model 507); the specific gravity of solutions and slurries in a process loop or in a tank (Model 509). Each instrument series consists of three basic parts: a measuring head, the electronic read-out, and the recorder/controller which displays the desired information and controls the measured variable. Each system can be provided with either analog or digital data presentation and control.

Nuclear-Chicago Corp., 359 E. Howard Ave., Des Plaines, Ill.

For more details circle 146 on Enclosed Return Postal Card.

EFCO Steel Forms available with RETURN OPTION

Satisfaction is guaranteed when you purchase EFCO Lifetime Steel Forms for your concrete forming needs.

NEW CATALOG

Describes and illustrates EFCO Steel Forms and accessories with examples of many uses. Send coupon for your copy.



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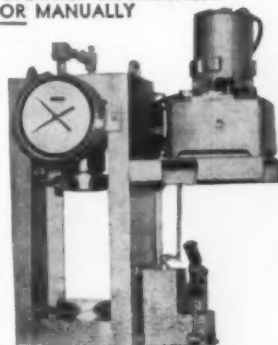
Please send new catalog on EFCO Steel Forms, and address of nearest sales office (there are 29 coast to coast).

Name _____
Firm name _____
Address _____
City _____ State _____

For more details circle 332 on enclosed return postal card

FORNEY JOB-SITE CONCRETE TESTER FT 20-E

- CONFORMS TO ASTM STANDARDS
- OPERATES ELECTRICALLY OR MANUALLY



- PERMANENTLY MOUNTED ELECTRIC PUMP
- 250,000 LB. LOAD RATING FOR CYLINDERS, CORES, BLOCKS, BEAMS, CUBES, BRICK AND DRAIN TILES

FORNEY'S, INC.
TESTER DIVISION • BOX 310
NEW CASTLE, PA., U. S. A.

For more details circle 297 on enclosed return postal card

Metal Protection

A black coating for protecting metal against rust and other exposure conditions has been announced by Maintenance, Inc.

Offered under the trade name Everwear J-41-B, the paint is reputed to produce an attractive ebony black finish that will withstand water and chemical attack by gas fumes and smoke. It is said to be anti-corrosive above and below grade. It is reported to remain elastic, permitting it to expand and contract with metal during extreme temperatures changes, making it useful in painting of tanks, metal roofs, bridges, beams and the like. The paint can be either brushed on or sprayed, and comes in 5 gal. pails or 55 gal. drums.

Maintenance, Inc., Wooster, Ohio

For more details circle 147 on
Enclosed Return Postal Card.

Custom Layouts

New visual control or schedule board, the Meno Flex, featuring simplicity, flexibility and ease of operation, was announced by that Ohio company.

The unit comes complete with all elements allowing the user to make his own custom layout, using pressure sensitive tape and letters to create column rule lines and column title headings. Fifty flexible plastic strips

$\frac{3}{4}$ in. wide and 31 in. long are held in the board at the edges, slide up and down and snap in and out for easy rearrangement. Entries or notations are made directly on the plastic strips with a grease pencil and may be erased with a cloth or tissue.

Memo Flex Div., 519 Bannock St., Dayton 4, Ohio

For more details circle 148 on
Enclosed Return Postal Card.

Chamfer Strip

The addition of a new product, a polyvinylchloride chamfer-strip called Economy-Former, was recently announced by Waljohn Waterstop, Inc.

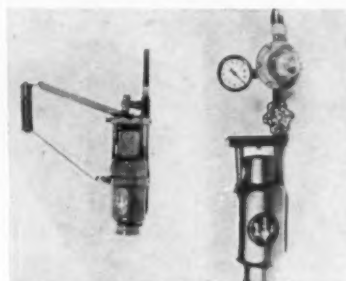
The primary purpose of this is to achieve rounded corners for columns of poured concrete used in major construction work. The rounded corner resulting, is said to prevent stripping and the smooth surface adds strength to the porous masonry column. Made of virgin resin, this corner-former has superior advantages over other types of material. The manufacturer states that it will not deteriorate, is completely water and weather resistant, and prevents corrosion. The Economy-Former is available in four sizes: $\frac{3}{8}$ in., $\frac{3}{4}$ in., 1 in., and $1\frac{1}{2}$ in. radii. These are standard stock sizes for all types of construction work.

Waljohn Waterstop, Inc., 400 88th St., Brooklyn 9, N. Y.

For more details circle 149 on
Enclosed Return Postal Card.

Liquid Burners

Two new compact, light weight LP-Gas "Liquid" Burners, the CW-2 Corwill Jet Flame Burner with 600,000 B.T.U. capacity and the CW-3



Corwill Jet Flame Burner

Corwill Jet Flame Burner with 1,000,000 B.T.U. capacity are being produced by Corwill International Corp.

Used wherever intense, even, immediate heat is required, the burners are said to produce a low cost heat for contractors and others, for heating, thawing and melting.

Corwill International Corp., P. O. Box 1030, Cedar Rapids, Iowa

For more details circle 150 on
Enclosed Return Postal Card.

TD-20 Track Link

A new strutless track link providing an even wear pattern and additional wear surface now is available for the International TD-20 crawler, it was announced by International Harvester Co.

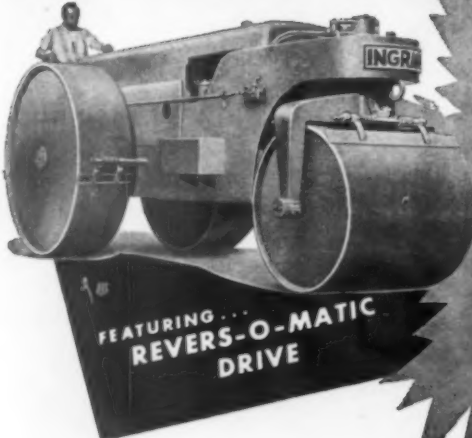
The link, replacing a strutted version, is plastic quenched, a hardening procedure where a solution of plastic material and water passes over the metal. The method is said to give flexibility to the hardening process of various patterns. Ends of the strutless link have been rounded to be concentric with the track pin, so as to prevent interference with the track roller when the chain is bent in a reverse direction. The new link's enlarged center opening permits the tracks to clean themselves, reducing the packing of materials in the track chains.

International Harvester Co., 180 North Michigan Ave., Chicago, Ill.

For more details circle 151 on
Enclosed Return Postal Card.

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ROLLERS



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5 to 12 TONS
TANDEM AND
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• COCOA ROLLER MATS •
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KENNEDY'S Brooms BUILDING
PAIRS

VAN BRUSH MFG. CO.

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LIGHTWEIGHT HEAVY DUTY ALUMINUM SKATE WHEEL CONVEYORS

(90 lbs. normal load capacity
per wheel)

10 FT. LENGTHS 12 IN. WIDE

Shipping Weight Approx. 37 lbs.

\$34.95 Per 10 Ft.
Length
10 Wheels
per ft.

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FOR SALE CONSTRUCTION EQUIPMENT

Two—Caterpillar D-8 Tractor S/N 13A 2699 & 13A 2696 W/Cat 8A angle dozer, Cat. No. 25 CCU, Crankcase guard, pull hook, Canopy top. Like-new undercarriage. Tractor in Excellent Condition. Each **\$14,500**

Two—Caterpillar No. 12 Motor Graders S/N 8T16242 & 8T 10460 w/electric starter, power steering, scarifier and cab. 1300 x 24 tires all around, 100% tread on tires. Machines are in excellent condition .. **\$12,500**

One—Warner-Swasey Model 2460 Gradall with IHC UD-350 Diesel engine, 4-ft. extension and 3-ft. digging bucket. Mounted on Duplex 6 x 4 factory carrier with gasoline engine. Machine has been completely overhauled and both engines rebuilt **\$19,900**

One—Warner-Swasey Model 2460 Gradall with GM 4-71 engine with 4-ft. extension and 3-ft. digging bucket. Mounted on Duplex 6x6 (Front Wheel Drive) with gasoline engine. Machine has been completely overhauled and is in very good condition **\$21,000**

Ten—Kenworth End Dumps Model 820. 15 yard capacity rock beds, 200 h.p. Cummins engines, air clutches, power steering, new tires. All have been inspected and put in excellent condition **\$16,500**

Three—Euclid Model 86FD, with 200 h.p. Cummins engines, 15-yd. capacity end dump rock beds, near-new tires. Trucks are **\$14,500** in very good shape

TERMS: 1/2 DOWN AND UP TO 24 MONTHS
TO PAY AT 6% INTEREST

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TU 7-1032, TU 7-4162
509 W. 27th St., HIALEA, FLA.

BRAND NEW Air Compressor Spare Parts AT GIVE AWAY PRICES

FOR BRUNNEN MOD. 212P, 5 CFM, 3 Stage - Cyl. Block, \$2.50; Cyl. Head...\$1.25
FOR ING.-HAND, MOD. D-60, 3 Stage Valve Assy, Inlet OR discharge, comp... 3.25
FOR ING.-HAND MODELS F3221-C & F3221-G -
LP Piston Assy., comp. Pl. #21178T... 1.50
HP Piston Assy., comp. Pl. #21178AT... 2.75
Unloader Assy., Inlet, Pl. #14800A... 2.50
Unloader Assy., starting, Pl. #3W-12177T 4.00
FOR QUINCY MOD. 300, 5 CFM, 3 Stage HP Piston, .010 oversize, Pl. #1545... 1.25
LP Piston, .010 oversize, Pl. #1531... 1.25
FOR CHICAGO-PNEUMATIC MODEL 105 PG 20, 105 CFM HP Piston, Part #1-27043..... 2.50
FOR WORTHINGTON MOD. H-850-E16, 50 CFM HP Piston Assy., comp. Pl. #1PST 48A... 4.00
LP Cyl. Head, Pl. #11D-89..... 2.50
FOR CHAMPION MOD. RE-4, 5 CFM, 3 Stage - Gaskets, hand-hole cover..... .05
LP Valve Seats, exhaust, Pl. P IN 85.... .20
Prices F.O.B. Lula, Ga., Payment With Order
HENRY SAMARA - LULA, GA.

CLEARING HOUSE SECTION

WD-60 KOEHRING DUMPTOR, 6 1/4 cu. yd. with GMC 4-71 Diesel power.

CAT. D4 SKIP LOADER with 72" 3/4 cu. yd. Bucket.

10' x 34' TRUCK SCALES with concrete deck, 55,000 lb. cap. in 5 lb. increments. Ideal for stock feed lot.

15,000 GAL. VERTICAL DIESEL FUEL TANK with elec. driven pump and meter.

ADAMS 51 MOTOR GRADER with Int. diesel power.

2 1/2 CU. YD. WILLARD WEIGH BATCH-ER. Ford V-8 power with extra 2 1/2 cu. yd. dumping hopper.

C & T Rock Co.

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12 in.....	\$10.45
24 in.....	10.35
36 in.....	10.00
48 in.....	9.90
60 in.....	9.80
90 in.....	9.65
120 in.....	9.50
180 in.....	9.25
360 in.....	9.00

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Final closing date is the Fifteenth
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COMPANY.....

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5/6 Cross Chains. Standard 4-Link Spacing

TIRE SIZE	PRICE PER PR. SINGLES	PRICE PER PR. TRIPLE DUAL	GROSS CHAINS PER EA.
750 x 20	12.50	22.50	.40
825 x 20	14.50	26.50	.40
900 x 16	12.50		.45
900 x 20	17.50	27.50	.45
1000 x 20	19.50	29.50	.45
1000 x 22	19.50	29.50	.45
1100 x 20	19.50	29.50	.55
1100 x 22	21.50	31.50	.55
1200 x 20	23.50	39.50	.60
1300 x 24	27.50		.70
1400 x 20	25.50		.70
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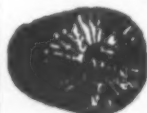
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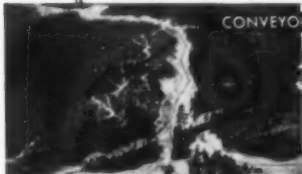
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END DUMP EUCLIDS



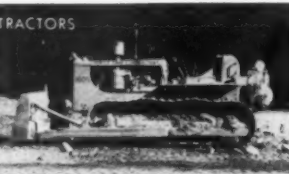
5—Model 46TD Euclid End Dump Units, 15 cu. yd., powered by Model NHRBIS Cummins Engines; 10—Model 63TD Euclid End Dump Units, 15 cu. yd., powered by Model 6-110 GMC Engines.

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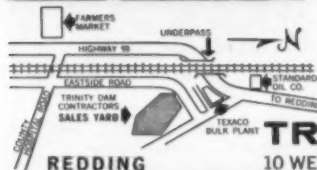
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Euclid 20 TD 10583	22½ tons	Boise, Idaho	1950
Euclid 20 TD 10591	22½ tons	Boise, Idaho	1950
Euclid 20 TD 10830	22½ tons	Boise, Idaho	1950
Euclid 20 TD 10837	22½ tons	Boise, Idaho	1950
Euclid 20 TD 10581	22½ tons	Boise, Idaho	1950
Euclid 32 TD 11475	22½ tons	Boise, Idaho	1951
Euclid 20 TD 10582	22½ tons	Coeur d'Alene, Idaho	1950
Euclid 20 TD 10836	22½ tons	Coeur d'Alene, Idaho	1950
Euclid 63 TD 21201	22½ tons	Dutch John, Utah	1957
Euclid 63 TD 21708	22½ tons	Dutch John, Utah	1957
Euclid 63 TD 21709	22½ tons	Dutch John, Utah	1957
Euclid 2 FD 2785	15-tons	Indianapolis, Indiana	1957
Euclid 2 FD 2965	15-tons	Indianapolis, Indiana	1957
Euclid 5 FD 1288	15-tons	Indianapolis, Indiana	1950
Euclid 5 FD 1521	15-tons	Indianapolis, Indiana	1949
Euclid 27 FD 3438	15-tons	Indianapolis, Indiana	1952
Dart 10SUG57038	10-ton Underground	Indianapolis, Indiana	1952
Dart 10SUG57052	10-ton Underground	Indianapolis, Indiana	1952
Mack LR15 1159D	15-tons	Indianapolis, Indiana	1952
Mack LR15 1053D	15-tons	Indianapolis, Indiana	1952
Mack LRV2D 1242D	34-tons	Hibbing, Minnesota	1952
Mack LRV2D 1243D	34-tons	Hibbing, Minnesota	1952
Mack LRV2D 1244D	34-tons	Hibbing, Minnesota	1952
Mack LRV2D 1245D	34-tons	Hibbing, Minnesota	1952
Mack LRV2D 1247D	34-tons	Hibbing, Minnesota	1952
Mack LRV2D 1248D	34-tons	Hibbing, Minnesota	1952
Mack LRV2D 1287D	34-tons	Hibbing, Minnesota	1953
Mack LRV2D 1297D	34-tons	Hibbing, Minnesota	1953
Mack LRV2D 1343D	34-tons	Hibbing, Minnesota	1954
Mack LRV2D 1342D	34-tons	Hibbing, Minnesota	1954
Mack LRV2D 1344D	34-tons	Hibbing, Minnesota	1954
Mack LRV2D 1345D	34-tons	Hibbing, Minnesota	1954
Mack LRV2D 1341D	34-tons	Hibbing, Minnesota	1954
Mack LRV2D 1302D	34-tons	Hibbing, Minnesota	1953
Mack LRV2D 1014D	22½ tons	Indianapolis, Ind.	1953
Mack LR2D 1089	30-tons	Hibbing, Minnesota	1954
Mack LR2D 1046	30-tons	Hibbing, Minnesota	1954
Mack LR2D 1203	30-tons	Hibbing, Minnesota	1954
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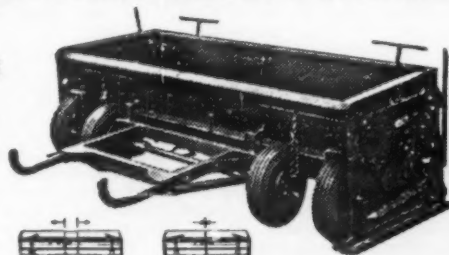
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1103	ALLIS-CHALMERS Model HD-5B Doser, S/N 25810; diesel engine, hyd. straight doser blade	\$7,900
1100	ALLIS-CHALMERS Model HD-5B Tractor, S/N 2206, GM 4-T1 diesel engine, S/N 35553; Garwood bulldozer blade Model HT-23, S/N 271; 18" track	\$9,000
1086	ALLIS-CHALMERS Model HD-12A Tractor Doser, S/N 30; GM 6-T1 diesel engine, Baker Model 15R straight hyd. doser blade, S/N 131; 20" grouser	\$13,000
896	ALLIS-CHALMERS Model HD-16AC Tractor Doser; Crawler Doser, S/N 703, A-C Diesel; hyd. torque converter, cable straight doser blade Model CT164 w/pusher plate; Model 75 FCU, 22" grouser	\$17,500
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894	ALLIS-CHALMERS Model HD-5G Tractor Loader, S/N 2746, GM 2-T1 diesel engine, hour-meter, 1 1/4 cu. yd. hyd. loader TS-5, 13" semi-grouser	\$8,500
1080	CATERPILLAR Model 933 Tractor Loader, S/N 11-A-2425, Cat diesel engine with electric starting, 1 1/4 cu. yd. hyd. bucket, oil clutch, 13" semi-grouser	\$9,900
1053	ALLIS-CHALMERS Model HD6G Crawler Loader, S/N 10977, A-C diesel engine Model HD-344, Model TS-6, 1 1/4 cu. yd. two-position A-C bucket #8028	\$14,000
1123	ALLIS-CHALMERS Model HD6G Tractor Loader, S/N 1433, 1 1/4 cu. yd. A-C diesel engine Model HD-344 S/N #8987, Tractor Model TS-6 1 1/4 cu. yd. two-position Loader S/N 943	\$8,500
1126	CATERPILLAR Model 938 Crawler Loader, S/N 13-A-1403, 1 1/4 cu. yd. Cat D-518 diesel engine, 6-volt electric starter, oil clutch, front pull hook, tip back bucket 1 1/4 cu. yd., 15" semi-grouser	\$9,750
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707	LeTOURNEAU-WESTINGHOUSE Model C Tournapull, S/N GP-40423 CPFH, powered with GM 6-T1 engine, Lucite windshield, 24:00 x 25, 18 ply tires; Model C Scraper, S/N 8-60064 CM with 24:00 x 25, 18 ply tires, sideboards	\$17,000
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Hydraulic Pumps

Four models of International engines now can be factory equipped with Webster gear-driven hydraulic pumps it was announced by International Harvester Company's Construction Equipment Div.

The engines are the UC-221 and UC-263 carburated models and the UD-236 and UD-282 diesel versions. Rated at 1,000 psi and with a capacity range from seven to 18 gpm, the pumps facilitate the use of such attachments as power steering, hydraulic cylinders for push-pull work, and hydraulic motors. Gear trains on these International engines are designed to accommodate 20 intermittent horsepower at 2,400 rpm. Four pumps are available for the UC-221 and UC-263 carburated engines, and a like number for the UD-236 and UD-282 diesel engines.

International Harvester Company, 180 N. Michigan Ave., Chicago 1, Ill.

For more details circle 152 on
Enclosed Return Postal Card.

Aluminum Welding

A fast, economical process to the manufacture of aluminum products was recently announced by Olin Mathieson Chemical Corp.

Refinements developed by the company's metallurgical research laboratories will now make the MIG arc spot welding process more useful to many makers and users of aluminum truck trailers, and grating.

In suitable applications, according

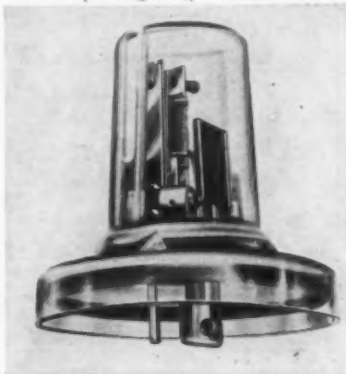
to the company; the process will result in more rapid production, substantial labor and equipment savings and product appearance as compared with those attainable with riveting or conventional resistance spot welding.

Olin Mathieson Chemical Corp., 460 Park Ave., New York 22, N.Y.

For more details circle 153 on
Enclosed Return Postal Card.

Tubeless Photo Control

Public works officials gained a new assist in their programs for extension of multiple lighting to rural streets



Tubeless Photo Control and smaller communities, with an announcement by Precision Multiple Controls Co. of a new tubeless control for outdoor lighting.

The new unit, designated as the "Multiplex", embodies the same two-compo-

nent circuitry used on field installations. Eight single-pole single-throw models that are said to fit any NEMA-standard locking type fixture head are offered. It is reported adaptable to any municipal, industrial and railroad installation, including pendant and old-style solid head fixtures, through the use of twelve mounting accessories.

Precision Multiple Controls, Inc., 233 Chestnut Street, Ridgewood, N. J.

For more details circle 154 on
Enclosed Return Postal Card.

Hydraulic Pump Motors

A new line of Tr1/Clad '55' spline-coupled hydraulic pump motors has been introduced by General Electric.

Available in NEMA frame sizes 182, 184, 213 and 215, the new motor is offered in addition to the open-adaptor hydraulic pump motor design announced last year. Motors in the new line are almost three inches shorter than those in the present open-adaptor design, according to company engineers. This shorter length is particularly significant when pumps are mounted on both ends of the motor, the engineers added.

The new pump motor is furnished with the coupling, eliminating the need for selection, purchase and assembly of a separate coupling. The coupling is splined on the motor end and has a conventional bore and keyway.

General Electric, Schenectady 5, N.Y.

For more details circle 155 on
Enclosed Return Postal Card.

WHAT ABOUT YOU, MR. READER?

Are you still active in the field? Have you moved or changed your position?

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Even if you think we know all about you, please fill in the information requested below and send to us by return mail. Our auditors require proof of accuracy of our mailing list. You are the only person who can help us on this. Do it now before you forget, so you can be sure your magazine will always be properly addressed to you. New names cannot be added or old names retained on our list unless we have all this information. Please print or type.

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Safety Hats

A new line of electrical safety hats has just been announced by the Boyer-Campbell Co., Detroit.

Fabricated from new-formula plastic, the headgear has been designed to offer double protection — from electrical shock as well as impact. The hats are



Boyer-Campbell Safety Hat

reported to meet E.E.I. specifications. Another feature is their ability to resist impact, withstanding 40 ft.lb without showing visible structural or material weakness. Also of note is the penetration depth of the material, which is stated to be 1/4 in. The hat shell material is uniformly strong, corrosion resistant and maintenance free. Not only does it provide insulating safety, but permits instant visual detection of even minute damage, thus assuring continuing protection. Standard color of the new line of hats is yellow.

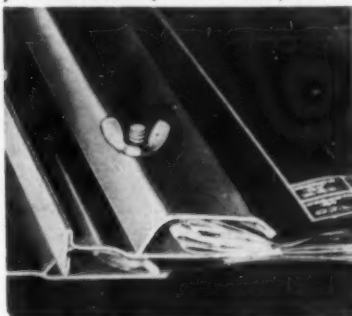
Safety Division, The Boyer-Campbell Co., 801 W. Baltimore St., Detroit 2, Mich.

For more details circle 156 on Enclosed Return Postal Card.

Vertical Blue Print File

A means of volume filing all popular size plans, vertically, adjacent to small walls, in closets or other critical space areas, was announced by Momar Industries.

An all steel, direct clamp retainer reported to hold up to 100 blue prints, it



is tightened and loosened for plan insertions and removals by three spaced thumb-nuts. The unitized top track "glides" into, or out of, a full length channel. The channel is easily applied to any type frame or overhead section.

Momar Industries, 4176 W. Montrose Avenue, Chicago 41, Ill.

For more details circle 157 on Enclosed Return Postal Card.

Narrow Gauge Paving

A new bituminous narrow gauge paver for paving varying profiles was

recently announced by Trac-Machinery Corp.

The Contour Trac-Paver as it is called, has a 5000 lb. hopper and is conveyor-fed from the hopper to distributing screws in front of the screed. The screed has a hydraulic driven vibrator which develops 3000 lb. force to the form section of the screed for



Contour Trac-Paver

compaction. The form section of the screed is replaceable for producing various shaped profiles. The screed is heated by L.P. gas burners. The paver is equipped with a hydraulic variable speed winch for propulsion when paving.

Trac-Machinery Corp., Nunda, N. Y.

For more details circle 158 on Enclosed Return Postal Card.



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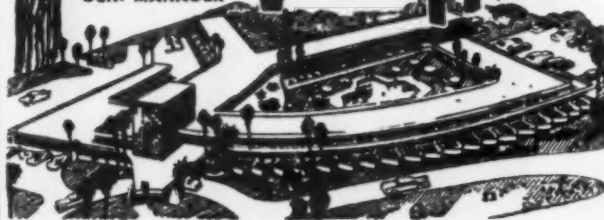
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Manufacturers Literature

MOBILE HEATERS: A new bulletin describing the MH Series of mobile heaters for personnel, cargo or equipment heating has just been released by Hupp Corp., Cleveland, Ohio.

These heaters provide instant fresh air heat at low cost, operating on any common liquid fuel such as gasoline, kerosene, fuel oil or diesel oil. Models MH 15, MH 30, and MH 60 are described in the bulletin.

The heaters are for use on trucks, buses, construction equipment, emergency vehicles, and other mobile equipment. They provide heat for passengers and operators, for window defrosting and cargo, or for quick engine warm-up to assure easy starting in cold weather. Fuel shut off is fully automatic if the heater fails to ignite. The combustion burner is totally enclosed. Adjustable clamps permit mounting the heater in any position.

For more details circle 159 on Enclosed Return Postal Card.

NEW PAVES: Power steering and a finger tip controlled folding hopper are two features of the redesigned Suburban Paver described in a new bulletin from Blaw Knox Co., Construction Div., Mattoon, Ill.

The wheel type power steering is reported to ease operation and increase maneuverability. Folding hopper wings, hinged at conveyor line, are de-

signed for clean dumping action. The 4-ton capacity hopper's folding design assures maximum use of each load of bituminous mix and reduces hand labor. The rubber-tired machine also includes eight speed transmission, a locking differential for improved traction, self-power for job-to-job travel, and a free-floating screed.

For more details circle 160 on Enclosed Return Postal Card.

EQUIPMENT CATALOG: A new four color catalog describing the complete line of Michigan construction and bulk materials handling equipment is available from the Construction Machinery Div. of Clark Equipment Co., Benton Harbor, Mich.

For more details circle 161 on Enclosed Return Postal Card.

DRAGLINE BUCKETS: A new brochure, DH 360 covering the all new Page dual hitch automatic dragline bucket, has been issued by the Page Engineering Co., Clearing Post Office, Chicago, Ill. The Dual Hitch can be adjusted in a matter of minutes to dig at any desired depth above or below the fairlead with the same degree of digging efficiency and capacity. This 6 pg. brochure shows the Dual-Hitch in action and illustrates the many features that are built into this all purpose bucket.

For more details circle 162 on Enclosed Return Postal Card.

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TINE BUCKET: A 4 pg. two-color circular showing the Rockland tine bucket and the Rockland rake and canopy cab for mounting on the Michigan line of tractors has been released by the Rockland Co., 3788 W. Colonial Dr., Orlando, Fla.

Other circulars available show Rockland attachments for Euclid, Allis Chalmers, Oliver and International Harvester tractors.

For more details circle 163 on
Enclosed Return Postal Card.

CONVERSION FACTORS: A reference table for engineers and other executives in wall chart form has been published by Precision Equipment Co.

This conversion chart is useful for engineers, shop men and executives. Included are common conversions such as inches to centimeters or watts to h.p. as well as many conversions that are difficult to locate in reference manuals. Other examples are atmospheres to Kgs./sq. cm, cm/sec to miles/hr. cu. ft. to liters, microns to meters, quintal to lb.

For more details circle 164 on
Enclosed Return Postal Card.

TRUCK RECORD BOOKS: Truck cost record books and forms for driver daily reports to assist truck users in evaluating the performance of their equipment are being offered by the motor truck division of International Harvester Co., 180 N. Michigan Ave., Chicago 1, Ill.

The truck cost record book, form AD-20, consists of 20 pgs. and each book allows an accurate record to be kept of all fixed, operating and maintenance charges against one truck for one full year. The driver daily report, form AD-26, may be used in conjunction with the truck cost record book. It provides space for reporting information such as number of trips, trip time, number of stops, mileage loads and fuel and oil consumption.

For more details circle 165 on
Enclosed Return Postal Card.

CONCRETE CURING COMPOUNDS: Catalogs covering concrete curing compounds have been released by the A. C. Horn Research Laboratories, Sun Chemical Co., 2133 85th St., North Bergen, N.J.

Marketed under the name Horncrete, it describes the Resin base curing compound, together with their advantages, uses, specifications, and quantities required. These Horncrete products were evolved to fill the need for curing compounds which offer a seal against water loss, surface strength, high compressive and flexural strength, easy application, quick drying, uniform slab strength, safety and labor saving.

For more details circle 166 on
Enclosed Return Postal Card.

BACKHOE ATTACHMENTS: A new 4 pg. two color specification/feature bulletin covering backhoe attachments, and options for crawler mounted, carrier mounted, and self-propelled crane-excavators, was released recently by Schield Bantam Co., Waverly, Iowa.

Specifications and work ranges are described along with illustrations of the standard backhoe, long boom backhoe, hydraulic bucket, V type bucket, rock bucket together with all the options available with the Bantam backhoes.

For more details circle 167 on
Enclosed Return Postal Card.

TWO-WAY RADIO: A new extensively-transistorized Motrac Two-Way Radio line is described in a brochure now available from Motorola, 4501 W. Augusta Blvd., Chicago 51, Ill.

The booklet contains explanations and illustrations of the benefits made possible through the incorporation of transistors in the new unit. Among the advantages described are low current drain, compactness, reduced maintenance and high audio power. A special section is devoted to the research and engineering of the new line of radios.

For more details circle 168 on
Enclosed Return Postal Card.

With The Manufacturers

Kaiser Builds Kaiser

A new seven-acre complex of office space, shopping and business facilities dominated by the 28 story home of the Kaiser industrial organization has been officially completed, Kaiser announced.

Working in the largest office building west of Chicago, the full home office staff of the company and 60 affiliated companies, some 2500 people in all, will be centrally located in this building that was built with 80 percent material manufactured by Kaiser. It is occupied entirely by the Kaiser organization, and the company reports that there is already talk of expanding more.

INDUSTRIAL BOILER CO.: Mr. Percy Todd has been appointed general sales manager of Industrial Boiler Company, Inc., of Chattanooga, Tenn., manufacturers of the Chattanooga Materials Heater.

For the past twenty years he has been employed in an executive capacity, primarily in sales for one of the leading asphalt plant manufacturers. He is a mechanical engineering graduate of Georgia Tech.

GENERAL TIRE & RUBBER: In its continuing product development General Tire is building a new \$2½ million Tire Test Center in Magadore, Ohio.

This center will enable General Tire to obtain more advanced and meaningful tire test data. The evaluation of this data is expected to result in the adoption of new tire ideas and the improvement of existing tire designs.

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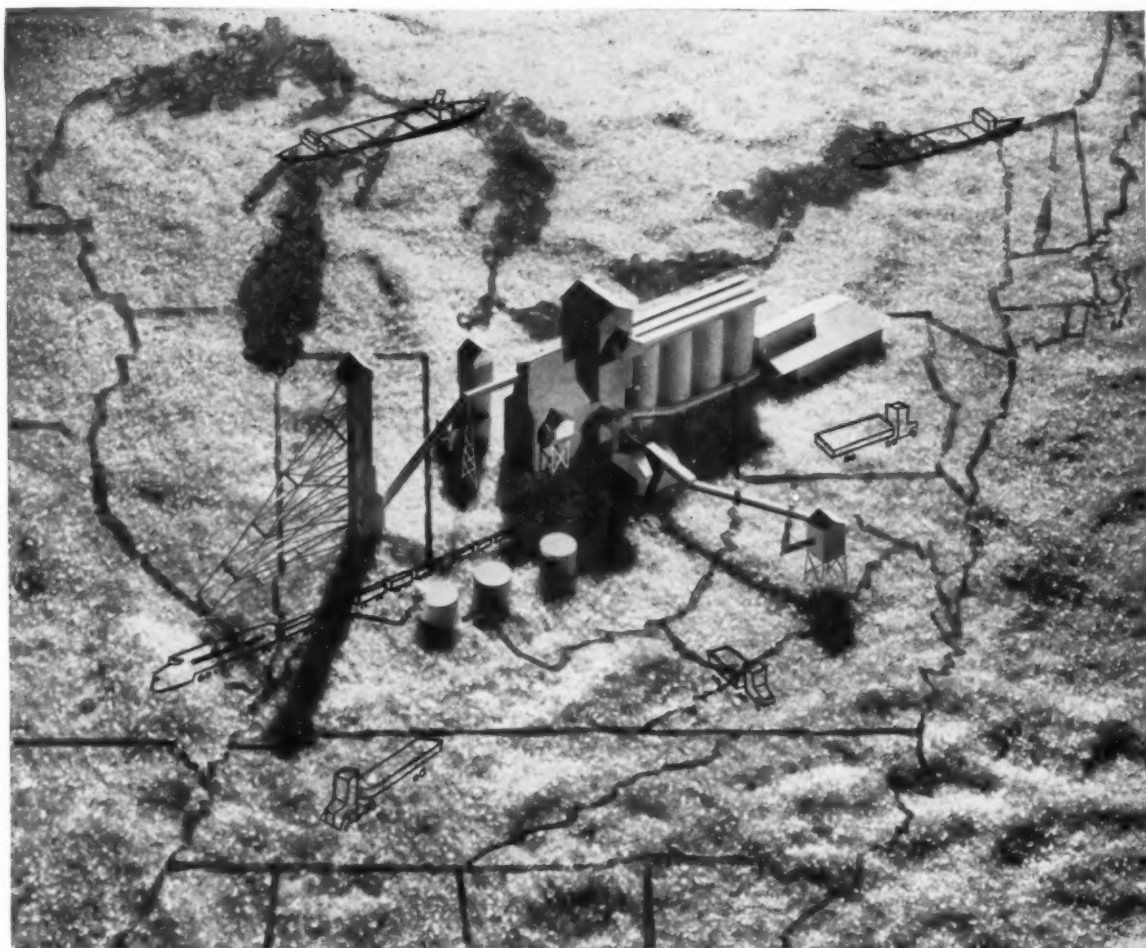
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Located 29 miles east of Cleveland on Lake Erie, Morton's Fairport Mine offers a convenient source of SAFE-T-SALT (rock salt) for the snow belt cities of the East and Midwest. This new mine can deliver SAFE-T-SALT by boat to all Great Lakes ports and by truck and rail to inland customers.

The new Fairport Mine is but one of several strategically located sources of Morton SAFE-T-SALT, assuring Morton customers prompt, dependable delivery in time for winter.

Be ready all winter—keep plenty of SAFE-T-SALT on hand
Now is the time to check your supply of Morton SAFE-T-SALT for ice and snow removal. You'll want sufficient quantities in stock so you don't get caught short in the event of late snow storms or a prolonged winter like last year. Your Morton representative can advise you on the best way to stockpile Morton SAFE-T-SALT without loss or inconvenience. Any salt remaining at the end of winter can be put to excellent use in summer road stabilization projects.

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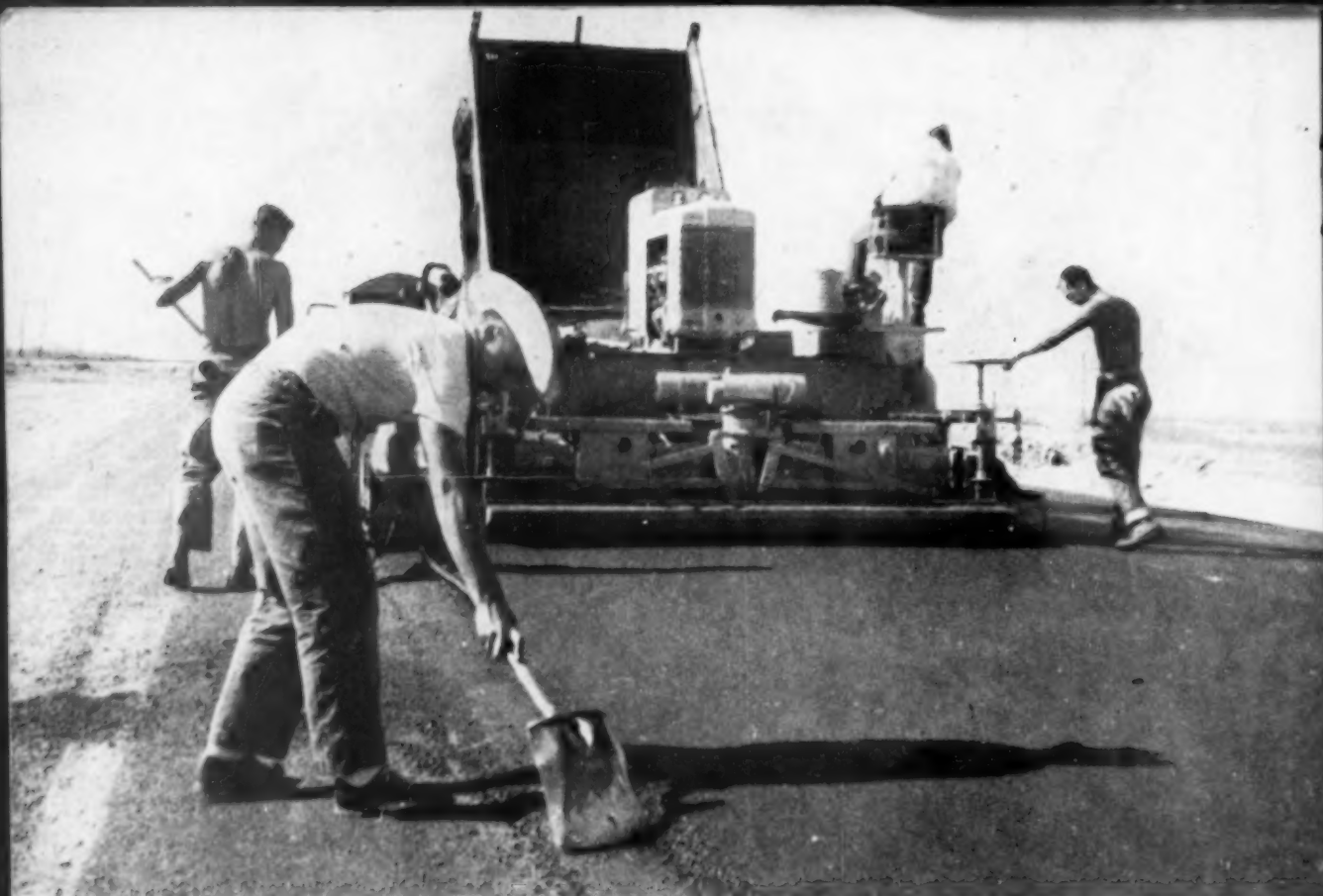
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This 11-mile section of State Highway 61 passes through Nebraska's fertile wheat growing country. At harvest time, heavy trucks loaded with grain use the highway to reach elevators and rail heads.

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